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HOME GEOGRAPHY

GREATER NEW YORK EDITION

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TARR AND McMURRY GEOGRAPHIES

HOME GEOGRAPHY

GREATER NEW YORK EDITION

BY

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*WITH MANY COLORED MAPS AND NUMEROUS ILLUSTRATIONS
CHIEFLY PHOTOGRAPHS OF ACTUAL SCENES*

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PREFACE

THIS is the first of a series of geographies; the more advanced treatment deals at greater length with the world and its inhabitants. Since Part I of the present volume is a radical innovation, it perhaps needs an explanatory foreword.

NECESSITY OF HOME GEOGRAPHY.—The final basis for all study of geography is actual experience. Yet text-books on that subject rarely treat Home Geography at all, and those that do, devote but few pages to it. This subject should, we think, receive far more careful attention.

NECESSITY OF OTHER BASAL NOTIONS. — Home experience alone, however, cannot offer a complete basis for the later study of geography, because no one locality presents all the features required. From this it happens that the best books have contained some definitions and illustrations, as of mountain, river, valley, harbor, and factory, and have planned to build the later text with the ideas these gave as a foundation. Such conceptions are certainly necessary in the early part of geography; but mere definitions fail to produce vivid, accurate pictures. The average pupil who has pursued geography for a year, has little notion of the great importance of soil, of what a mountain or a river really is, of the value of good trade routes, and why a vessel cannot find a harbor wherever

it will cast anchor along the coast. Yet such ideas are the proper basis for the study of geography in the higher grades. The fact that they are so often wanting is proof that our geography still lacks foundation.

HOW THESE NEEDS ARE MET.—The first 110 pages of this volume attempt to supply this foundation by treating first, such common things as soil, hills, valleys, industries, climate, and government, which are part of every child's environment; and secondly, other features, as mountains, rivers, lakes, and the ocean, which, though absent from many localities, are still necessary as a preparation for later study. Definitions, however, are not relied upon for giving the child this extra knowledge, but detailed descriptions and discussions instead. This by no means involves neglect of the child's own environment from the time the unfamiliar matter is introduced, for throughout the geographies home experiences are frequently used. We believe that our plan gives a fuller guarantee of fitness for advanced study than has heretofore been furnished.

RELATIONSHIP TO MANKIND. — According to the definition of geography, — which treats of the relation between man and the earth, — a hill or a lake is worthy of mention only because it bears a relation to us, the men upon the earth; considered by itself it is not a part of geography. Therefore each chapter which takes up one of the above subjects, either closes with the bearing of the given topic upon mankind, or it deals with the human relationship throughout.

EARTH AS A WHOLE. — The most difficult portion of our task has been that which presents the Earth as a Whole. That a bird's-eye view should be given at an

early period in the child's instruction is not questioned; but it is not easy, in limited space, to support the principal facts with sufficient detail to produce vivid and interesting pictures. The authors have found that some topics commonly included in the early study, such, for instance, as latitude and longitude, should be postponed. They have also found that many other minor subjects usually presented are comparatively irrelevant to the geographical knowledge necessary to a pupil. By setting these aside for the time, space has been secured for a physiographic basis, and for a fairly close sequence in tracing the effects of physical conditions upon plants and animals, and also upon mankind. Throughout each chapter much care has been taken to present a closely related chain of thought, and at the same time to keep the leading facts in their proper foreground.

SUGGESTIONS FOR FURTHER HOME STUDY. — A study of books alone can never furnish an adequate knowledge of geography. Therefore it has been thought expedient to add numerous suggestions at the end of each section, in order to remind both teacher and pupil of suitable excursions, experiments, etc., and to show at the same time the breadth of the subject. In this way physical activity — the love of exercise — may be employed in the service of the study, and a habit of investigating the home environment encouraged.

FREQUENT REVIEWS. — Believing in the value of frequent reviews, the authors have suggested review material in frequent comparisons and contrasts, and in introducing new topics through others that have already been presented. This method has been used throughout this book, and in the more advanced treatment.

MAPS. — The succeeding volumes in the series are not much larger than the present one. Our reasons for this marked innovation are that the old form is both unnecessary and unwieldy. The main excuse for the size of the common geography is the supposed need of large maps, a need which should be supplied by atlas and wall maps. This supposed requirement has led to the introduction of so many names, entirely unnecessary to pupils, that the purpose of a school book has generally been sacrificed to that of a cheap atlas. Why should a map, intended for school children, contain such Servian names as Valievo, Kragouyévatz, Ushitze, and Kruchevatz, four neighboring words upon an overcrowded map in one of the much-used geographies? Such piling up of names, which carry no meaning to the pupil and are distinguished by no idea, merely distract attention from the important names and features. Aside from that, the old form of geography is distinctly objectionable because of its size, which makes it difficult to handle and to carry. When open, it occupies nearly the entire surface of the desk; and, being so unwieldy, it is the most easily damaged of all the school books in use.

The most pertinent inquiry in regard to the maps of a text-book of geography should refer not to their size, but to their quality. In respect to the excellence of maps we challenge comparison. We believe that our maps are the best thus far printed in an American geography. While thoroughly artistic, they cause the *essential* features to stand out with surprising distinctness. Contrary to the usual custom, the political maps include the principal physical features, so that any place is always seen in connection with its physiographic surroundings. The

colors have been so selected as to secure harmony, and at the same time to show the boundaries clearly. Unimportant names are excluded, even where space might have permitted their introduction; and, to an unusual degree, the size of print is proportionate to the importance of places, so that the names of leading divisions, cities, etc., can be distinguished at a glance.

ILLUSTRATIONS. — The illustrations have been selected with great care to illustrate specific points; and for the sake of accuracy, photographs have in most cases been employed. They are not inserted merely for the purpose of entertainment, but in every case bear a direct relationship to the text. They are not intended as mere *pictures*, but as *illustrations;* and being numbered and referred to frequently, they pay for their space by contributing materially to the book's fund of instruction.

ACKNOWLEDGMENTS. — The photographs have been obtained from many sources; the globe drawings were made by Mr. Murray of the Matthews-Northrup Co.; and the other drawings were mostly prepared by Mr. C. W. Furlong, instructor in Cornell University. The maps have been prepared by the Matthews-Northrup Co. of Buffalo, who have obtained an enviable reputation as map engravers for the Century Atlas.

The authors of this book are responsible for any shortcomings that it may prove to have. They have had the benefit of much criticism of the best sort. Space does not permit them to refer to each one who has kindly extended aid; yet mention should be made of the exceedingly valuable criticisms and suggestions of Mr. Philip Emerson of the Cobbet School, Lynn, Mass.

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PART I

HOME GEOGRAPHY

I. THE SOIL

YOU have often played in the dirt. Did you ever stop to think what it is made of? It was not always what it now is. You know that the wood in your desk was not always a part of the desk; it used to be part of a tree, and has a long story to tell about itself before it was brought to your school. So all the dirt or *soil* that you have ever seen has a long story to tell about how it became what it is now. Let us see what that story is.

When mud dries upon your hands and you rub them together, you can notice an unpleasant, gritty feeling. This is caused by the scraping together of hard bits of something in the soil. If you rub some of this dirt against a smooth piece of glass, you can often hear it scratch the glass. This shows that these little bits must be very hard, for if they were not, they could not scratch anything so hard as glass. They must be even harder than a pin, for you cannot scratch glass with a pin.

It will help you to find out what these bits are if you examine some sand. The grains in it are tiny bits of rock, large enough to be clearly seen. When they are

rubbed against glass, they scratch it, because they are hard and sharp.

Sand is made of rock that has been broken up into very fine pieces. Soil is also made of rock, but the pieces are finer still. The soil that you have seen, such as that in the schoolyard, or by the side of the walk, was once rock.

Soil has been made from rock.

Since soil is found almost everywhere, you may wonder how so much rock has been changed to it. The answer is not hard to find. Did you ever pound a brick up into bits until you made brick-dust? You can change a stone to dust in the same way. Break one into small bits and see how much it resembles dirt.

Sometimes one sees men drilling holes into stone; the tiny pieces that are broken off collect in and round the hole, and look much like dirt. When a grindstone is used to sharpen tools, small pieces of the stone are ground off, and if water is poured upon it, this dust makes the water muddy, just as soil would.

Much rock has been changed to dirt by the rubbing of pieces of stone against one another. In this way tiny bits have been worn off, as chalk is worn away when rubbed against the blackboard, or slate pencils against the slate. Perhaps some of the dirt that you have seen has been made in this manner. Later you will learn about the glaciers which have caused much of this rubbing.

The grinding of rocks together has made much soil.

But this is not the only way in which rock has been changed into soil. Much of it has decayed and fallen to pieces as wood does. You know that, after a long time, stumps of trees, and the boards in sidewalks, grow so

soft that they fall to pieces. Perhaps you have called it *rotting*, but this means the same as *decaying*. The picture (Fig. 1) shows such a stump.

FIG. 1.
A decaying stump of a tree.

Other things even harder than wood decay in much the same way, although perhaps more slowly. Hard nails, at first bright and shiny, decay until they become a soft, yellow rust. Iron pipes and tin pails rust until holes appear in them and they leak.

You may not have thought that stones also decay, but they do. The headstones in old graveyards are often so crumbled that the letters can scarcely be read, and sometimes the stones have even fallen apart. The decay of rock may also be seen in old stone buildings, boulders, and rock cliffs. Have you ever noticed this?

FIG. 2.
A rocky cliff containing many cracks. Point to some of them.

Soil has been formed, also, by the decay of rocks.

There are several things that help to cause this decay. All rocks have cracks in them (Fig. 2). Usually some of these are so large that they can be plainly seen; but there are many others so tiny that they cannot be seen

without a magnifying glass. When it rains, the water steals into them, and by eating and rotting the rock, very slowly changes it to a powder.

The water may also freeze in these cracks and pry the stone apart. If you have seen iron water pipes, or water pitchers, burst in cold weather, you know how this is done. Some of the pieces of rock pried off in this way are very small, others quite large (Fig. 3).

FIG. 3.

Pieces of rock broken from a cliff by the weather. Can you also see the cracks in the rock of the cliff? Find some broken pieces in Fig. 2.

Plants help the water in this work. In search of food they push their hair-like roots into the cracks, and there remain until they grow so large that they also pry off pieces.

The earthworms that you may often see after a heavy rain also help in crumbling the rock. In order to get food, they take soil into their bodies and grind the coarse bits together until they become very fine.

Water stealing into the cracks causes rock to decay and crumble. Plants and earthworms also help to break it up.

Rock changes to soil most rapidly near the surface; for the rain, roots of plants, and earthworms can reach it more easily there than elsewhere. So the deeper into the earth one goes, the less the rock is changed (Fig. 4); and, no matter where you live, if you should dig deep enough, you would come to solid rock.

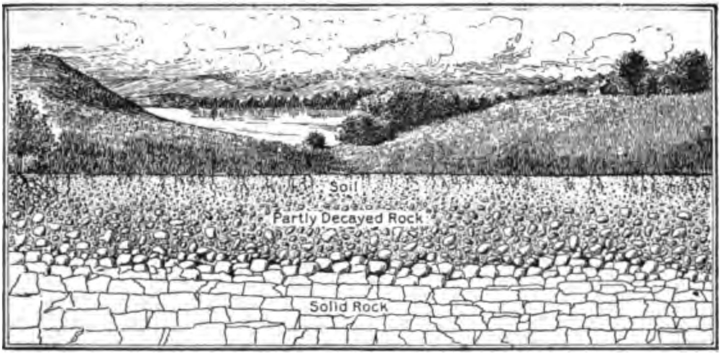

FIG. 4.

A section, as if the earth were sliced through, like a loaf of bread, so that the part below the surface is seen. Tell what you see in this picture. Notice the roots of the tree on the left side.

Fig. 5 shows soil about one and one-half feet deep. Sometimes there is much more than this, and men may

FIG. 5.

A picture showing solid rock beneath the soil. Notice the cracks in the rock.

even dig deep wells without finding rock; but in many places there are only a few inches of soil, or, sometimes, not even enough to hide the rock.

One reason for such differences in the depth of soil is that some rocks decay more easily than others. Another reason is that in some places the rain washes the bits away as fast as the rocks crumble. This may leave the rock quite bare in one place and make the soil very deep in another.

There is solid rock beneath all soil.

How different it would be if no rock had ever changed into soil! There could then be no grass, flowers, or trees around your home, because they grow by means of the food that they get from the soil.

Without grass there could be no cattle, horses, or sheep; in fact, few animals such as are found upon the land could live; for what would they eat? What, then, could you yourself find to eat? There would be no vegetables, no bread, butter, and milk, and no meat. You see that, if there were no soil, few people could live; so that the dirt under our feet is a very valuable substance.

Without soil, few plants, animals, or people could live on the land.

Soil is needed by plants because it holds water. They become thirsty as well as you. Where the dirt is only a few inches deep, it may dry out on hot summer days, and then the plants die; but where it is deep, the roots may reach down several feet till they find damp earth.

It is surprising how long the roots of some small plants are (Fig. 6). For example, the clover in the picture is less than a foot high, but its roots are longer than you are tall. They reach so deep down that even in dry weather the clover is green while other plants, with shorter roots, are withered and dry. Some trees push their roots

down a greater distance still. Can you find out how long the roots of any weeds are?

The soil holds food, as well as water, for plants. In it is found something which plants need, and which they take up through their roots; it is a part of the soil itself, and is called *plant food*. Each blade of grass and each limb of a tree contains some of it; and when a piece of wood is burned, some of this food is left behind in the ashes.

FIG. 6.

Some of the roots of the clover that the boy is picking have reached out into the air through the side of the bank. They were seeking water.

Every person even has a quantity of it in his body; your bones and teeth are partly made of it. But you did not take it directly from the soil; the plants took it for you, and you received it from them in flour and other foods that you have eaten.

Soil furnishes water and food to plants.

All plants do not need the same kind of food any more than all animals do. Horses eat hay and grain, while dogs eat meat; so some plants need one kind of food, others another. These different kinds of plant food are found in the different kinds of soil, of which there are very many.

For example, some soils are fine, while others are coarse, because some rocks have crumbled to finer bits than others. Then, too, there

are many kinds of rock, such as granite, marble, and sandstone; and when they decay they make different kinds of soil.

In some places great numbers of plants have grown up and died. During their growth they took substances from the air, as well as from the soil, and when they died and decayed they returned some of these to the soil. These plant remains have become mingled with the soil, making it dark and sometimes almost black. In some places this dark-colored layer may be several feet deep, as in forests, or in swamps, where plants have been growing and decaying for hundreds of years. This is an excellent soil for farming, because it produces large crops.

There are many different kinds of soil.

Soil that has much plant food in it is said to be rich or *fertile;* if it has little, it is said to be poor or *sterile.* The plants are taking away some of this food; they are really robbing the soil. But when weeds and trees fall and decay on the spot where they grew, they pay back what they took away. In fact, some of this food is returned to the earth every autumn when the leaves fall from the trees.

But if plants are carried away from the spot where they grew, there is danger lest fertile land shall be robbed of so much plant food that it will become sterile. Now this often happens; for farmers send away their wheat to make flour, and haul their corn, hay, and oats to market. Some farmers have done this for so many years that they are no longer able to support their families on their land, but have been obliged to move away to find other farms where the soil has not been robbed of its plant food.

The wise farmer takes care to put some plant food back upon the soil to pay for what he has taken, so that he may continue to raise good crops. That which he puts back upon the soil is called a *fertilizer*, because it keeps the soil fertile. People in the city often use a fertilizer to feed the grass of their lawns and keep it green.

Fertile soil may be robbed of its food and become sterile.

Review Questions. — (1) Of what is the soil made? (2) How can you show that the little bits in it are hard like rock? (3) What happens when rocks are rubbed together? (4) If you have ever seen rocks that were decaying and crumbling, tell about it. (5) How does water enter rocks? (6) What happens when water freezes in the cracks? (7) What else helps to crumble the rocks and soil? (8) What is beneath the soil? (9) Make a drawing, like Figure 4, showing the rock beneath the soil. (10) Tell about the depth of the soil. (11) Why is there no soil in some places?

(12) Why is the soil worth studying? (13) Name two things that plants take from it. (14) Of what advantage is a deep soil? (15) Do all plants want the same kind of food? (16) What causes the different kinds of soil? (17) What has made some soils so black? (18) What is fertile soil? (19) Sterile soil? (20) How are some soils robbed of their plant food? (21) What is used to make them fertile once more? (22) Tell what you see in Figs. 1, 2, 3, 4, 5, and 6.

Suggestions for Study at Home and out of Doors. — **Here are things, some of which, at least, you will be able to see or do for yourselves**: (1) Find a place where men are digging a ditch or cellar, to see how the dirt looks below the surface. (2) Find a boulder, cliff, old stone wall, or an old headstone in a graveyard, and see if the stone is crumbling. (3) Break some pebbles open to see whether or not they are decayed on the outside and fresh within. (4) Change a stone to dust. (5) Collect several different kinds of soil. (6) Plant beans in each kind, at the same time, and see in which one they grow best. (7) See what the effect would be if no water were given to some of them. (8) Find out what trees and vegetables grow best near your home. (9) What do the farmers prefer to raise? (10) Go to a hot-house to find out what kind of soil is used there, and what is done to keep it fertile. (11) Visit a gardener or a farmer to find out how he cultivates the soil. (12) How many articles can you name, as crockery, for example, that are made of soil or clay? (13) Write a short story about the soil.

For References, see page 108.

II. HILLS

THE soil that has been formed from rock has not been left smooth and level like a floor. The surface of the land is usually uneven or rolling; and even those places which at first sight appear level, are really sloping (Fig. 7). Beside such gentle slopes, there are many

FIG. 7.

A very level plain; but since a stream is flowing through it, there must be slope.

others steep enough to allow coasting in winter, and others still that are much too steep for this purpose. In other words, ***hills***, some gently sloping, some steep, are found almost everywhere upon the surface of the earth (Fig. 8).

These hills have not always been here. Even the ones you may have seen and climbed have been slowly made. Let us see what has caused them.

When it rains slightly, the water soaks into the ground and disappears; but when there is a heavy rain, all of the

water cannot sink into the soil as rapidly as it falls. Some then begins to flow away. One little stream, perhaps hardly an inch wide, begins at one point; another joins it; quickly several of them unite, and soon a good sized

Fig. 8.

A picture in a hilly country. The surface of the lake is level; but the hills, some steep, others gently sloping, are very irregular.

brook or creek is formed. Have you not noticed this flowing water in the school yard, in the roads, and on the sides of hills?

But did the water flow off without taking something with it? Was it not muddy? This means that soil had become mixed with the water and was being borne away. Every heavy rain bears along much soil, cutting out little channels, washing out roads, and perhaps even destroying the beds of railways, so that trains must stop running for a time.

During such a rain little channels, or *valleys*, and tiny *hills* and *ridges* are carved in the soil (Fig. 9). No doubt you have seen these formed very many times. If not, you can easily make them by pouring water from a sprinkler upon a pile of loose dirt.

There are many heavy rains every year, and in a lifetime their number is very large. During many hundreds of years, then, the water could wash away an enormous

amount of soil and rock which the large streams and rivers would carry away to the sea. By this means deep valleys have been formed, with hills between them, much as the tiny channels in the school yard are cut in the dirt by the rain water.

Then, also, some rocks are not so hard as others, and the softer ones, as they break up, are naturally carried away faster than those that are harder. This leaves high ground where the rocks are hardest.

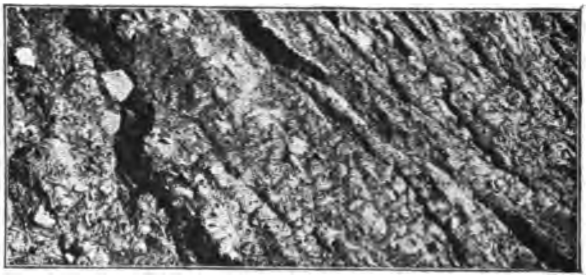

FIG. 9.

Little hills and valleys cut in the soil by heavy rains. Point to some of them.

What a change water must have made in the appearance of the surface of the earth! No doubt, in the very beginning there were hills and valleys; but every year, for thousands of years, these have been slowly changing, so that they are now very different from what they were long ago. And after many more years they will be very different from what they now are, for they are even now changing.

Most hills have been carved out by running water.

In every neighborhood there are hills, although they may not be very high. The picture shows one with a somewhat gentle slope

(Fig. 10). If a person were to walk up this hill, going from its *base* to the top, or *summit*, he would walk more than a mile; but this, of course, does not mean that the hill is a mile high.

For example, in Figure 11 you see a board ten feet long, with one end resting on the ground and the other on a fence four feet above the ground. If a person starts at the lower end and walks to the upper end, he travels ten feet; but he is then only four feet above the ground.

Fig. 10.

To show the difference between the slope of a hill and its height.

The height of a hill is much less than the length of its slope.

Perhaps you have heard that it is colder on the summit, or *crest*, of a high hill than at its base. If one takes a thermometer with him when going to the top of the

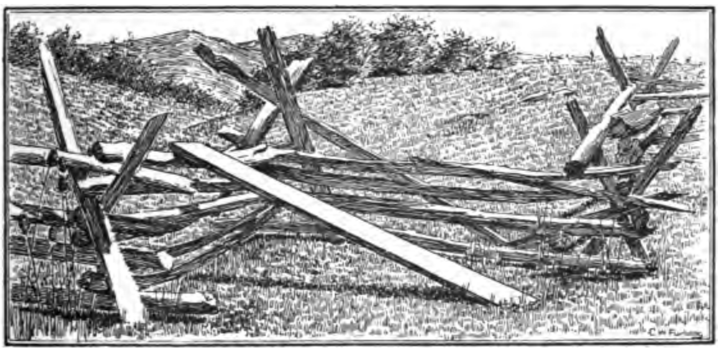

Fig. 11.

Washington Monument (Fig. 85), which is 550 feet high, he finds that it is about two degrees colder at the top than at the base. One might not notice any difference in climbing low hills, but it can be easily noticed on high ones; and if your home is near one, you can prove this.

People who live where there are high hills often observe that it snows upon them while it rains upon the lower ground at their base (Fig. 12). Explain why this is so.

It is colder at the crest of a hill than at its base.

FIG. 12.

Do you see any reason for thinking that it is colder near the summit of this high mountain than at its base? This is Mount Chimborazo in South America, where it is very hot in the lowlands.

Many people prefer to build their houses upon hills, partly because the air is cooler and fresher in summer; but another and more important reason is, that it is more healthful to live on this high ground. Where the land is low, the slope is often so gentle that the water cannot flow off readily, so it stands, sometimes making wet places called *swamps* (Fig. 33). Houses in such places often have cellars and foundation walls that are damp, and the people who live in them are in danger of fever, and of other kinds of sickness caused by this dampness.

But the water usually runs quickly away from a hill, so that even after a heavy rain the ground soon becomes dry. In large cities, where land is very expensive, people build almost anywhere; but in these cities there are so many drain pipes, or *sewers*, to carry off the water, that even the low places are quite dry.

Fig. 13.

A castle built upon the brow of a high hill.

In times past some men were in the habit of building great castles, with thick walls, on the crests of hills (Fig. 13). From these they could look out over the country for a long distance and spy approaching enemies in time to prepare for them. Then, too, the steep sides of the hills were difficult for the enemy to climb, so that the people living in castles on hilltops were quite safe.

Some of the Pueblo Indians built their towns upon the tops of steep hills in order to be safe from the more savage Indians who attacked them. For much the same reason the Puritans, many years ago, were in the habit of building their churches upon the hilltops.

Hills at present are little needed for such a purpose; but there is another reason why people like to live upon them. From their tops they can look out over the fields for long distances and enjoy the beautiful views. Have you yourself ever enjoyed such a view?

People like to build their houses upon hills, because it is healthful there and the views are beautiful.

REVIEW QUESTIONS. — (1) Is there much land that is really level? (2) What do you understand by rolling land? (3) Were the hills that you know always there? (4) Have you seen water carrying away soil? If so, tell about it. (5) Explain how hills have been made.

(6) What is the base of a hill? (7) The summit? (8) Tell what you learn from Figure 10. (9) From Figure 11. (10) Make a drawing somewhat like Fig. 11. (11) On what part of a hill is it coolest? (12) How could you prove it? (13) Why does it often snow on hills while it rains on lower land near by?

(14) What is a swamp? (15) Why should not houses be built on swampy ground? (16) Why are hills liable to be dry? (17) Why is the lowland in cities usually so dry? (18) Why have castles often been built on hills? (19) Why did the earlier settlers place their churches on hills? (20) What other reasons can people have for wishing to look far out over the country?

SUGGESTIONS FOR STUDY AT HOME AND OUT OF DOORS. — (1) Find some ground about your home that seems nearly level. Is it really level? (2) Where is the longest slope in your neighborhood? The steepest one? (3) Watch the water carrying off soil after a rain. Where does the soil go? (4) Write a story about it. (5) Hunt for a washout after a heavy rain. (6) Where is your highest hill? (7) In what season of the year is it especially pleasant to live on a hill? Why?

(8) Can you find any houses built on low, wet soil? (9) Are their cellars ever very damp? (10) Ask some doctor why one should not live in such places. (11) Find some pictures of castles, showing their location. (12) Is your schoolhouse upon a hill? (13) Name any houses in your neighborhood that stand on a hill. (14) Where is your most beautiful view? (15) Do your friends agree with you that it is the most beautiful one?

For REFERENCES, see page 108.

III. MOUNTAINS

You may never have seen mountains, but you have certainly seen something that looks much like them. Often, on a summer evening, the sun sets behind great banks of clouds that reach far up into the sky. Some of them have rough, steep sides, and great, rugged peaks,

Fig. 14.

A scene among the White Mountains of New Hampshire.

while others have more gentle slopes, and rounder tops. Oftentimes there are many of them together, and they are so real that it seems as if one might climb their sides if he could only reach them.

This is very much the way snow-covered mountains appear in the distance; in fact, the resemblance is so close that, when one is at a distance from mountains, he must often look carefully to note whether he is looking at real mountains, or only at clouds in the sky.

The mountains in Fig. 14 are much like hills, except that they are larger. Hills are seldom more than a few

hundred feet high, while these mountains rise two or three thousand feet in height. Some mountains are so low, and their slopes so gentle, that one is able to climb to their tops without much trouble. Such mountains are often called hills. But many others are even two or three miles in height. Their *peaks* rise far above the clouds and are often wholly hidden by them, as in Figure 15.

Fig. 15.

A mountain peak in Switzerland, with snow on its sides and base, and a small cloud hiding the very summit.

Usually where there is one mountain peak there are others near by (Fig. 16). They often extend a long distance, perhaps hundreds of miles,

Fig. 16.

A number of lofty mountain peaks near together.

forming what is called a *mountain chain*, or a *mountain range*.

Such great ranges have not been carved out by running water, as hills have been. In fact, real mountains are found only where parts of the land have been slowly raised or lowered until some portions are much higher than the surrounding country (Fig. 17). Among these mountains, as elsewhere, running water has of course cut out many valleys.

You can imitate mountain folding by crumpling a number of sheets of paper. The reason for this folding of the rock layers will be found stated on page 125.

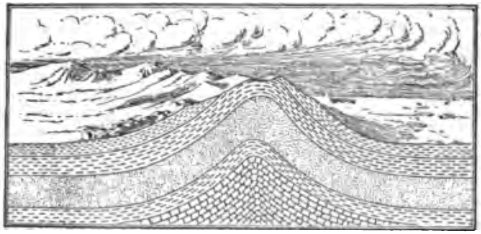

FIG. 17.

This is a drawing of a mountain range sliced through so as to show the layers of rock that have been pushed upward.

Mountains are masses of rock that have been pushed above the level of the surrounding country.

Men often climb to the tops of mountains. It might seem that this would not take a very long time, nor be very difficult; but to go to the crest of even a low mountain is often quite a task. Upon a level road one can easily walk a mile in less than half an hour. But it might require a whole day of steady climbing to reach the summit of a mountain only one mile high.

It would be a long journey even if one could go in a straight line to the top. It has already been stated (page 13) that to climb a hill two or three hundred feet high it is necessary to walk a longer distance than this. The same is true of mountains.

Most mountains are so steep that one would grow very tired climbing directly up their slopes; so a much longer, zigzag path is usually followed. Then, too, there are often steep *cliffs*, or *precipices*, that could not be climbed (Fig. 18), and one must travel round these to find a place where the slope is gentle. This makes the path still longer, so that to climb a mountain one mile high it might be necessary to walk ten miles, or even more.

Fig. 18.

A mountain precipice in the Yosemite Park among the Sierra Nevada Mountains of California. No one could possibly climb the face of this steep rock cliff.

If the air is colder at the crest of a hill than at its base, one might expect that it would be *very much colder* on the top of a high mountain, and this is true (Fig. 12, p. 14). In fact, it grows so much colder near the summit of the higher mountains that it *never* rains there, but snows instead; and it may even be so cold that trees cannot grow there (Fig. 20, p. 23).

It is a long distance to the top of a high mountain, and the air is cold there.

Many people cross the ocean to visit the Alps Mountains in Switzerland; but while they enjoy climbing about on the sides, and looking at the beautiful views, very few ever reach the summit of the higher peaks. Mont Blanc is one of the best known of these, and is nearly three miles in height. (The picture, Fig. 20, shows views of Mont Blanc.)

It is very difficult, and even somewhat dangerous, to climb to the summit of this mountain. When a person wishes to do so, he must employ guides to help him over the difficult places.

The round trip usually takes two nights and three days; as there is no place to obtain food high up on the mountain side, it is necessary to carry it. Overcoats and blankets are also necessary; for even though the journey be made in the hottest summer weather, it will be bitterly cold upon the mountain top.

Suppose that we are making such a journey. We start early in the morning so as to have a long day. Each of us carries a few light articles, but the guides and porter carry most, for they are strong and used to climbing.

FIG. 19.

A picture of the timber line on the snowy slopes of a mountain in Colorado.

At first we walk along a pleasant path in a beautiful wood. A house is occasionally passed (Fig. 20, G), and perhaps a green field. But soon there are no more houses and fields, and the trees become smaller and smaller, until the line is reached above which it is so cold that no trees can grow. This is called the tree line or *timber line* (Fig. 19).

From this point on, no plants larger than bushes are seen, and after a while even these disappear. Meanwhile the soil and the grass have become more scarce, while here and there banks of snow are found in

the shady hollows. Soon we have climbed to the *snow line*. This is the line above which snow is found all the year round. Now, no matter in what direction we look, rock and snow are everywhere to be seen, the latter often being hundreds of feet deep (Fig. 20, F).

What a beautiful view before us! It repays us for all the hard work. We look down upon the woods through which we have just passed; then, over beyond them, to the deep valleys, with the green fields, pretty houses and villages far below us; and, beyond these, to the other steep mountains upon the opposite side of the valley.

The guide takes his place in front of us, and often tells us to stop while he goes ahead to examine the way. It may be that the snow has bridged over and hidden a deep and narrow chasm, so that if one were to step upon this snow he might fall through.

Sometimes the guides lift one of us over a dangerous place; and, when it is steep or slippery, fasten all the members of the party together with ropes (Fig. 20, E), so that if one falls, the others may hold him.

As we advance higher and higher, it is often necessary to take a narrow path on the steep side of the mountain. On the right you can look hundreds of feet almost directly downward; on the left are great stones and masses of snow almost directly overhead.

The snow sometimes falls, forming snow slides or *avalanches*, which are very dangerous. They come tearing down the sides of the mountains with a terrible roar, burying whole villages beneath them. You have seen the same thing, on a much smaller scale, when snow has slid from the roofs of houses on warm winter days.

After one night spent in a little house about half way up the mountain side, and after much hard work on the next day, we reach the summit (Fig. 20, A). Here, in spite of our wraps, we are all shivering; for upon high mountain summits there are fierce winds which seem to go through even the thickest cloth.

On this barren mountain top there are no birds, no trees, no grass: nothing but snow and rock; but if it is a clear day, and there are no clouds clinging to the mountain sides below, we may be able to look down into the beautiful green valleys, only a few miles away. There the birds are singing, flowers are blossoming, and men, working in the fields, are complaining of the heat.

It is a difficult and dangerous journey to the top of a high mountain.

Fig. 20.

Seven photographs taken on a journey to the summit of Mont Blanc. See if you can find in these pictures any of the scenes described.

It is by no means so difficult to reach the summits of all mountains. Many of them (Fig. 14, p. 17) are so low that there is no snow upon them in summer, and trees live and thrive even at the top. Roads may have been made to the summit, so that one may drive up instead of walking.

FIG. 21.

A hotel at the base of a lofty mountain at Banff, on the Canadian Pacific Railway, in British Columbia, Canada.

Among some of these mountains hotels are built (Figs. 21 and 24), to which people go in summer to escape the hot weather. There they may walk through the woods, and climb to many interesting places, where fine views are to be had.

Mountains are important summer resorts.

FIG. 22.

Here men are digging gold ore deep in the mountain side. The ore is hoisted to the surface and crushed to bits in these buildings, so that the particles of gold can be separated from the rock.

Perhaps you already know that the rocks in-

FIG. 23.

This man is deep down in the earth in an iron mine. He is preparing to load the car with ore which other miners have been digging in a tunnel just above, on the right-hand side.

side the mountains sometimes contain gold and silver (Fig. 22). Iron, lead, and other *metals* are also found there. When they are dug out from the rocks they are *ores*, which do not look much like these metals as we know them. But the metal in the rings, watches, and silver dollars that you have seen, and even the iron parts of your school desk, may have come from the rocks of some mountain (Fig. 23).

The trees in the mountain forests are also valuable. The most common kinds are evergreens, such as the pine, hemlock, and spruce, which are green even through the winter, and which can live on the cold mountain sides as far up as the timber line.

The land upon a mountain side is usually too steep and rocky for farms. But even where farms are not possible, trees often grow finely, covering the mountain for miles and miles with dense forests. This is fortunate, for the trees may be cut down and sawed into lumber, from which all sorts of wooden articles are made. Possibly the very seat in which you are sitting was once a part of a tree that grew on the side of a mountain.

Mountains are of further use because of the abundance of water that they supply. We have already seen that there is much ice and

Fig. 24.

The forest on the sides of the White Mountains, New Hampshire. The large buildings are the hotels of a summer resort.

snow upon some of them; in fact, there is so much upon the higher ones that it can never all melt away, no matter how hot the summer may be.

During hot weather many streams dry up; but at such times the ice and snow of the mountains only melt the faster, so that the streams which flow forth from these mountains are even more swollen than usual. This water may run along for many miles until it finally reaches towns and cities where people need it to drink. Do you know of any city that gets its drinking water from such a river?

Mountains furnish metals, lumber, and water.

Review Questions. — (1) What can you say about the height of mountains? (2) How have they been made? (3) What is a mountain chain or range? (4) How long might it take to climb a mountain a mile high? (5) Why so long? (6) What can you tell about the cold at the summit? (7) How do the trees change in appearance as one mounts higher and higher?

(8) What would you need for a journey up Mont Blanc? (9) Describe the first part of the journey. (10) What is the timber line? (11) What is the snow line? (12) What are avalanches? (13) Describe the view from the top of the mountain.

(14) Mention some reasons why mountains are favorite summer resorts. (15) What kinds of mines are found in mountains? (16) Why is it fortunate that trees grow so well on mountain sides? (17) What is done with them? (18) Tell what you can about the streams that flow from mountains.

Suggestions. — (1) Watch for clouds that resemble mountains. Make a drawing of them. (2) Find pictures of mountains; note the timber line, the snow line, and other points of interest. (3) Represent a mountain in sand. Show the tree line; the snow line; steep and gentle slopes. (4) Represent a mountain range in sand. (5) In what direction are the nearest mountains? What are they called? How far away are they? Find out an interesting fact about them.

(6) Ask some one who has climbed a mountain to tell you about it. (7) Would you care to climb one yourself? Why? (8) Write a story relating the adventures you would expect in mountain climbing. Describe some of the views you would expect to find. (9) Why do few people live high up on the mountain sides?

(10) Examine a piece of ore (in some museum) and find out how the metal is taken from the rock. (11) Start a collection for the school by bringing some ores. (12) Hunt for pictures of woods on mountain sides. You will find several in this book. (13) Find some pictures which show gorges cut in the mountains by running water. (14) Find out some facts about glaciers.

For References, see page 108.

IV. VALLEYS

We have seen how water is always washing away soil, making hills and changing their appearance. Wherever hills are found there are always low places or hollows, and these are called *valleys.*

Fig. 25.

A beautiful stream in a wooded valley.

Some very small valleys you have already seen in Figure 9. They are only a few inches wide, and the tiny hills or ridges between them are only a few inches high.

Every stream of water, whether great or small, when flowing over soft earth, is carrying some of it away and forming valleys. Even when flowing over hard rock, the water is doing the same thing, but more slowly. It grinds the rock away by dragging pebbles and grains of sand over it, thus scouring it out. This work of the water is never finished, for every rain is slightly changing the valleys.

Are there any valleys in your neighborhood? Do you live in one? If you have travelled on the railway, you have certainly seen many of them. Figs. 11, 14, and 25

show valleys. Can you find others in the book? In Figure 25 is shown a small stream with the land on either side gently sloping toward it.

Since there are very few places without slopes and hills of some kind, there must be few places without valleys. Although some of these are narrow, others are so wide that one cannot see across them.

Wherever two downward slopes come together, a valley is formed, whether the slopes be long or short. In those that you can find, notice the difference in the slopes. If in one of the valleys there is a stream, notice the direction in which it flows. Why does the water flow at all? Which way is *down the valley?* Point *up the valley.*

You see, of course, that valleys have not only width, but length. Many of them are only a few inches long, and you can certainly find some of these. Perhaps your home is in a valley that is many miles in length. Find out if this is true.

Most valleys have been cut out of the land by running water.

FIG. 26.

The dotted lines show the divides between the valleys. Trace them. What else do you see in the picture?

In the picture (Fig. 26) you see several valleys. Rain falls into each of these, some of it sinking into the soil and some running off down the slopes. Into which valley will the water flow that falls on the top of the ridge?

When it rains upon the roof of a house (Fig. 27), the water is divided along the highest part, some flowing down one side, some down the other. The same thing happens when water falls on the land. Because the water

parts, or divides, at the highest place between two valleys, this place is called a ***divide*** or ***water-parting***, or sometimes a ***watershed***. The dotted lines in the picture (Fig. 26) show some divides. How irregular the lines are!

A divide sometimes stands out sharply, as on the roof of a house; but in many places it is difficult to find, for the land there may appear to be flat. Can you point out such a place in Figure 26?

FIG. 27.

A house roof, to show that the water is divided along the highest part.

If you wish to know how wide one of these valleys is, where would you begin to measure? Would it not be from the divide on one side to the divide directly across on the other side? Of course it would, for the divides form the boundaries of the valley (Fig. 28).

A divide or watershed is the highest ground separating two valleys.

FIG. 28.

The line *A–B* shows the width of this valley. Observe that the valley is much wider than the stream.

While the valleys that one usually sees are both narrow and short, there are some so long and wide that one could not travel their whole length or width, even if he were to spend all day and all night upon a fast train (Fig. 29). In our own country there is such a one, called the Mississippi Valley, which is over three thousand miles long and many hundred miles wide.

Fig. 29.

Picture of a river winding through a broad and very long valley.

When valleys are as large as this, their slopes must be very gentle. On that account many people who live in the Mississippi Valley scarcely know that they are in a valley. The river flows through the lowest part, and the homes of these people may be so far away that they have never seen it. All about them the land appears so level that it does not seem to form a part of a slope. It is

therefore called a *plain*. But when rain falls there, it immediately flows toward the river, thus proving that the plain is a part of the great Mississippi Valley slopes.

Such an immense valley was not cut out by running water. You have learned that hills are made in that way, but that mountains are formed by the rising of great masses of rock. Some of the great valleys, like the Mississippi, have also been made by changes in the level of the land. But even the valleys that have been formed in this way have generally been greatly changed by the water that has run through them.

Some great valleys have been formed by the rising or sinking of the land.

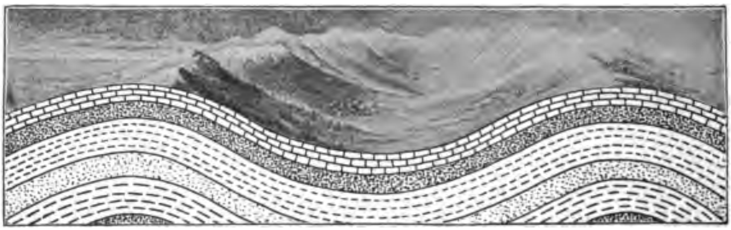

Fig. 30.

A valley sliced through to illustrate how valleys may be formed by the folding of the rock layers.

People generally choose the valleys for their homes. Even among high mountains, where it is impossible to live on the steep and cold sides, they often dwell in the bottom of the valleys. Here they are surrounded by lofty peaks which appear to shut them in almost entirely (Fig. 31).

Hills are often too cool, or else have too shallow a soil for farming. The rains have washed the dirt down the steep slopes into the lower part of the valleys, making a deep and fertile soil there. In the valleys, therefore, the

FIG. 31.
A city near some mines in a valley among the Rocky Mountains.

best farms are found, with their great fields of corn, oats, wheat, and grass. Here, also, cattle and horses are raised, (Fig. 32), many large cities have sprung up, and railways have been built.

FIG. 32.
A herd of cattle grazing on the clover that is growing in the deep, rich soil in a valley bottom.

Most of the land is really made up of slopes, and we are living upon them. It may not seem that your home is upon one, but it probably is. Your house may even be upon a hill-top, and yet you may be living in a broad valley.

Most people live in some part of a valley.

Fig. 33.

A ditch dug to drain a swamp.

The soil is all the more valuable because of the slopes of valleys. Were it not for them the water, after a heavy rain, would stand in a thin sheet upon the ground. But where there are slopes down which the water can freely run, it quickly flows off and does not drown the crops or make the region unhealthful for man and animals.

The great importance of this matter is shown when farmers buy land. One of the first things that they inquire about is *drainage,* that is the slopes, which allow the water to run off quickly.

If the water does not freely flow away, they even dig ditches in order to carry it off (Fig. 33). Sometimes these ditches are left open, as in the picture; but, more often, tiles are placed in the bottom, forming a kind of pipe, and then the earth is thrown back again. The water finds its way into the pipes, through small openings that are left for this purpose, and flows away. Good drainage is so important that men are often willing to incur great expense in order to secure it.

In some places the land is so nearly level that the standing water produces *swamps.* There are thousands of swamps in this country, and great sums of money are spent in digging ditches to drain them. This makes the swamp dry; and since the soil in such places is very fertile, a great deal of land that was once of little value is now changed to rich farms.

The slopes of valleys are valuable for drainage.

Valleys have had a great influence upon the roads of a country. For instance, in going across mountains men generally follow a valley, going higher and higher until they come to what is called a *mountain pass* (Fig. 34), which is nothing more than a valley between mountain peaks. After crossing this, they go down another valley on the other side of the mountain.

Railroads also cross mountains through the valleys and over the lower passes; they wind in and out, often making sharp curves in order to avoid cutting directly through the rock.

Even in hilly regions it is usually easier to get from one place to another by travelling in the valleys. In the

lower parts, near the streams, the land is most nearly level; but as soon as one attempts to go directly across the country, the roads become rough and hilly.

On that account, when white men first came to this country, and settled among the hills and mountains, they built their roads in the valleys, often quite near the streams. Men do the same thing still.

FIG. 34.

A mountain pass among the lofty Rocky Mountains of Colorado. Point to it.

Where the country is more level, as upon a plain, it is not so difficult to travel directly forward; but even in such places both the wagon roads and the railways are often built round a small hill rather than over it.

The location of wagon roads and railways depends on the valleys.

We have seen that hills and mountains afford many beautiful views. But it is not necessary to go to the mountains to see fine views. You may see them in almost any valley or plain. Even a field of

green grass, such as may be seen in city parks, and in the country, is beautiful. This is particularly true in the early spring, after the long, cold winter.

FIG. 35.

A beautiful New England roadway in Northfield, Massachusetts.

Those who live in small towns or cities may find streets where the trees have grown so tall that they droop and meet overhead (Fig. 35). As one looks down such a street, he can scarcely help exclaiming, "What a magnificent archway!"

In the country, also, there are many beautiful sights, such as the variously colored fields, the waving grain, the graceful trees, and the shady roads.

FIG. 36.

A scene in Boston Common after a heavy fall of damp snow.

The views change from time to time. They are not the same at noon as in the late afternoon when the sun is casting long shadows. In the spring the plants are fresh and bright; in the autumn they are prettily colored; in the winter

the damp snow clings to the trees, bushes, fences, and houses until everything is robed in white (Fig. 36). Again, the rain freezes to the trees, and when the sun appears, everything sparkles in the bright light as if it were covered with a thousand jewels.

It is not necessary, then, to travel far in order to find beautiful views; they are to be found everywhere, not only among the mountains, but on the hills, in the valleys, in the country and in the city.

The hills, mountains, and valleys are very beautiful.

Review Questions. — (1) What makes the little valleys? (2) Tell why they must change from year to year. (3) Describe some of those that you have crossed on the railway. (4) How many slopes are necessary to make a valley? (5) What is a divide? (6) Tell how large some of the largest valleys may be. (7) How have these very large valleys been formed? (8) What is a plain?

(9) In what parts of mountains do most people live? Why? (10) What is meant by drainage? (11) How do farmers sometimes provide drainage? (12) What is a swamp? (13) Why do roads and railways among the mountains follow the valleys? (14) What is a mountain pass? (15) Where is the most level land usually found? (16) What fields or yards near you are beautiful? (17) Are there any walks or drives that you greatly enjoy? (18) How do the views change from time to time?

Suggestions. — (1) Find a tiny valley and watch to see if it is changed in any way by a heavy rain. (2) Find a still larger valley in your neighborhood. (3) Find the divide on each side of it. (4) Show that streets and roads are so made that they have a watershed. (5) Make some valleys in clay or sand and show the divides. (6) Where is the largest valley in your neighborhood? (7) Is your home in one of the very large valleys, or in a small one? (8) Show by a drawing like Figure 30 how the largest valleys have been made. (9) Can you show it in any other way? (10) Why should swamp land that has been drained raise uncommonly good crops? (11) Do you know of any roads or railways that follow valleys and wind about the hills? Tell about them. (12) Find some beautiful views in your neighborhood. (13) Make a collection of pictures of valleys. (14) Write a story telling how valleys have been formed.

For References, see page 109.

V. RIVERS

Every heavy rain causes the water to collect, here and there, and flow down the slopes. At first only tiny rills are formed; but these unite to form the little streams and brooks.

In some places a brook is narrow and deep, in others broad and shallow; here it flows swiftly, and there slowly. Place a chip or a boat in such a brook, and it floats quietly in some places, and then, coming to a *rapid*, it is whirled along swiftly and perhaps upset (Fig. 37). Or it may float to a *waterfall*, where the water tumbles down from the top of a ledge, and then it is surely overturned (Fig. 38).

Fig. 37.

A noisy brook in the Adirondacks of New York, tumbling over its rocky bed.

There are large rivers in the world much like these little brooks, the main difference being in their size. But even such rivers are generally small at their beginning or *source*. Some of the largest have their sources far up in the mountains, where they are so small that a person can easily step across them.

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FIG. 38.

A mountain torrent leaping over the ledges in rapids and waterfalls. Point to one of the falls. Find others in the other pictures of the book.

The water of these rivers may come from the melting snows; and, as it dashes along, beating itself into foam by striking against the rocks, it is joined by other streams like itself. Often the water must rush round or leap over large boulders which lie in its path; and often it falls directly downward for many feet with a great roar (Fig. 75).

Great rivers at their source are usually no larger than a brook.

The water of a mountain stream seems to be quite helpless, with the great, hard rocks all about it ; but it never gives up its struggle with them. Rocky cliffs may reach far up into the sky on either side, and the slopes may be so steep that loose pieces of stone often fall into the water. But the torrent dashes these against one another, and grinds them against its rocky bed, until they are worn into pebbles. These pebbles are borne down stream and are slowly ground up into grains of sand and bits of clay.

If we should travel down such a stream, starting near its source among the wild mountains, we should find it constantly changing. In the first place, it gradually grows larger, because other streams, called *branches* or *tributaries*, enter it (Fig. 39). The *banks* become lower and the river grows broader and deeper. In places there may still be rapids and falls, but the country on either side is not

FIG. 39.

Two streams, the Allegheny and Monongahela, uniting at the great city of Pittsburg in Pennsylvania.

so steep and rocky as it was among the mountains. Now, houses, farms, and men are seen, and horses and cattle are grazing in the fields near the banks (Fig. 40).

At first, the slope of the *stream bed* was so great that the river hurried along faster than you could run. Now the water no longer flows rapidly enough to drag boulders or even pebbles; but it can still carry the sand and mud brought by the rain from the soil of the hillsides.

It has now been many days since this water left the

Fig. 40.

The Connecticut River in Massachusetts, flowing through a splendid farming country.

mountains. The river has become so wide that a long bridge is needed to cross it (Fig. 41), and so deep that one cannot touch its bed even with a long pole.

Fig. 41.

The long bridge across the Mississippi River at St. Louis.

At last, perhaps weeks after it started, the water approaches the ocean; and now the downward slope of the river bed is so gentle that the *current* cannot drag even grains of sand; but it still carries fine bits of rock-mud

with it. These bits may be so tiny that if you were to place some of the muddy water in a glass, it would take hours for all of them to settle and leave the water clear. When the river enters the quiet waters of the ocean, even this mud, or *sediment*, settles.

We have followed the river from the source to the *mouth* where it empties its waters into the great ocean. At first it was a little stream, but by the addition of water from many tributaries, it has grown larger and larger, until at its mouth it may be more than a mile in width.

A great river is broad and deep at its mouth, and its current is very slow; but it carries sediment even to the ocean.

We have been describing a large river that had its source in the mountains; but others are much smaller, and many do not start in the mountains. Some empty their water into other rivers, being tributaries, and others enter lakes rather than the sea. They may also have low, soft banks instead of high, rocky ones, and there may be neither rapids nor falls. But no matter where their sources and mouths may be, or what other differences may exist, they are, in many ways, much like this river.

FIG. 42.

A pebbly brook bed which is filled with water when the rain falls or the snow melts, but is often dry in summer.

Where does so much water come from? Taken up from the ocean, it falls from the sky in the form of rain

or snow. But we all know that small streams dry up and disappear soon after a rain. Even large brooks may become quite dry in summer (Fig. 42). Why, then, do not great rivers also dry up?

One reason is that many rivers have a constant supply at their source. That this is true of a stream starting in a high mountain is clear, because we have seen (p. 26) that the snow in such places never entirely melts away. It is also true of streams that have their sources in lakes and swamps.

Then, again, not all of the rain-water flows off, but some sinks down into the ground. There is a great deal of water in the ground, and it is this which men find when they dig wells. This underground water trickles through the soil, and through crevices in the rocks, often bubbling forth as a *spring*, weeks after it has fallen as rain somewhere else. Most large rivers are supplied with water from hundreds and even thousands of such springs.

It is to be remembered, too, that a great river, with its many tributaries, flows through a very large tract of country, so that when it is not raining in one part, the rain may be falling in another. Thus, while one tributary carries little water, heavy rain may keep others full, and this flows into the main stream, preventing it from drying up.

If a heavy rain falls, or if the snow melts rapidly, so much water may flow into a river that it rises and overflows its banks (Fig. 43). Those who live near such streams are in danger of being drowned by the floods, and in some places men have built banks of earth, called *levees*, to keep the water from overflowing the towns and farms.

The supply of river water comes from rain or melting snow, from lakes and swamps, and from underground.

Every one has seen muddy water flowing in gutters, or in rills on the hillsides. Great quantities of soil are washed away in this manner, as has been shown (p. 11). But what becomes of it all?

If you have seen a sidewalk or a field flooded with water, you perhaps remember that when the flood disappeared, a thin layer of fine mud was left. This mud was carried along by the current until it reached a place where the water stood almost still, then it slowly settled. The same thing will happen if some muddy water is allowed to stand in a glass for a time. Try it.

In much the same way, when there is a river flood (Fig. 43), the water spreads out on either side of the river in a great, thin sheet, flow-

FIG. 43.

Photograph of a river flood on the Ohio, which has forced the people to move out of their homes. Tell what you see in this picture.

ing slowly along and depositing a thin layer of mud. Each flood adds a layer, making the land higher, until, after many years, it is lifted considerably above the usual level of the river. Such land is generally a level plain; and since it is made by river floods, it is called a *flood-plain.*

Many pieces of land have been made in this manner; and you have perhaps seen some of them. Near the banks of streams the valley is often flat, and the hillsides that bound the bottom of the valley begin to rise at a considerable distance from the water (Fig. 44). This level land is usually a flood-plain. Near small streams such plains are gener-

ally narrow; but in the Mississippi and other valleys the flood-plains are many miles in width. Farmers like this soil because it is very fertile.

Some of the sediment carried by rivers forms flood-plains.

Fig. 44.

A small flood-plain between steeply sloping valley sides.

Much of the sediment is carried on until it reaches a lake or the ocean. Here, opposite the river mouth, the water is generally quiet, so that the mud sinks to the bottom. At first only enough sediment is collected to form low, swampy land; but this is gradually lifted higher and higher, by layers of mud from each flood, until it becomes high enough to make dry land.

Fig. 45.

This picture shows a river delta. What else do you see in the picture?

These plains at the mouths of rivers form

what are called *deltas* (Fig. 45). Many streams have such wide deltas that one cannot see across them, most of the sediment having come from fields, hills, and mountains, perhaps hundreds of miles away. The surface of the delta is a plain, because it cannot be built any higher than the floods themselves have reached.

From year to year more sediment is brought down, and the land is built further and further into the water, so that deltas are constantly growing. The slope of the river bed is usually so gentle that all of the water cannot flow out in a single channel. For this reason it enters the sea through several arms, cutting the delta into several parts.

Some of the sediment carried by rivers builds deltas at their mouths.

FIG. 46.

Picture of a river system and river basin. Point to some of the tributaries; to their source; to the mouth; to the delta.

A river entering the sea may receive water brought by hundreds of tributaries. Thus the rain that falls in places even hundreds of miles apart may at last be brought together in a single main stream. Such a main stream with all of its tributaries is called a *river system* (Fig. 46). For instance, we speak of the Mississippi River system, meaning the Mississippi and its many tributaries.

All the country which is drained by a single main stream is called a *river basin*. Thus all the land drained by the Mississippi River is included in the Mississippi basin.

One should not think of this as a true basin. A real basin, as a

wash basin, has a rim extending all around it. The rim of a river basin is the divide; but there is no divide, or rim, near the mouth of a river, since the water runs out into the sea. If it were a true basin, with a rim all around it, the water would collect and form a lake.

All the land whose waters are drained by a single river is called a river basin, and all these streams together form a river system.

Some ways have already been suggested in which rivers are of much use. They build flood-plains and deltas, thus making some of the most fertile land in the world. Rivers also furnish water to plants, animals, and man.

On page 6 it was shown that plants sometimes wither during hot weather, because the soil is dry. But near rivers the soil is usually kept so moist that plants grow well even in dry weather.

There are some places in the world where there is not enough rain for crops to grow. The people in such regions sometimes lead the water out of the rivers into ditches, through which it flows for long distances. Then it is spread out over the thirsty soil, so that plants can thrive. This is called *irrigation*, and in some places no crops can be raised without it.

Many animals and people depend on rivers for all the water they use. Even whole cities obtain their drinking water solely from rivers.

Streams not only bring water that is needed, but they also carry away that which is not wanted. A river is really a great ditch for draining the land, so that whenever the snow melts rapidly, or a heavy rain falls, the rivers quickly remove the water. They also carry off the filthy water, or sewage, of many towns and cities.

Rivers supply water that is needed, and remove that which is not wanted.

The water of rivers is also used for turning wheels to help make many articles, such as cloth and flour.

You have perhaps noticed how windmills work (Fig.

68). The *wind* blows the large wheel round and round, and it is so connected with other wheels that it can pump water, or turn a saw for sawing wood, or grind corn. Likewise *steam* is used to turn the wheels of a railway engine, so that it drags the heavy cars along.

River water is made to do work in much the same manner. Where there is a swift current, or where there are

FIG. 47.

A picture of an old mill and old-fashioned wheel. Much smaller wheels are now used, and they cannot usually be seen.

falls, as the Niagara Falls (Fig. 135), it is often easy to run some of the water off to one side through a ditch or pipe. The water, racing rapidly along, strikes a wheel (Fig. 47) and makes it whirl round. This wheel, being connected with others, causes them to turn also, much as one wheel in a clock causes others to revolve.

Thus machinery is set in motion by which logs are sawed into lumber, grain is ground into flour, cotton is made into cloth, and many other kinds of work are done.

The water that furnishes the power to turn the wheels is called the *water-power*, and the buildings in which such manufacturing is carried on are called *factories* or *mills*.

In many places the river water does not flow fast enough to strike a wheel with much force; water-power is found mainly in rivers with swift currents, and especially near rapids and falls. Here mills have been built, and then great cities have often sprung up (Fig. 75, p. 85).

Rivers also supply water-power for manufacturing.

There is still another way in which rivers are extremely valuable. It has always been difficult to find a convenient means for carrying goods from one place to another. In some places there are no roads; and even where there are, they are often hilly, rough, and muddy.

Yet most of the articles that we use every day, like sugar, flour, oil, meat, coal, lumber, and clothing, have been carried long distances, sometimes thousands of miles. Even if the roads were excellent, it would take a great deal of time, and cost much money, to bring these things in wagons. To carry them by railway takes less time, but is expensive.

A broad, deep river is really one of the finest roads in the world. To be sure, no wagons or cars can be drawn over it, but boats move there with ease. A river boat can carry as much as scores of wagons or cars (Fig. 48), and many may be going and coming at the same time, so that a large river is equal to several railroads: it costs little, too, to keep it in repair.

For these reasons carrying goods by boat upon rivers, or *river navigation*, is a very important business. Indeed, it is so important that in many places broad ditches, called

canals, have been cut in the soil and rock in order to carry goods by boat.

Before the railways were built, — which is no longer ago than when your grandfathers were boys, — boats were used for carrying all sorts of articles from place to place. Even to-day, when there are so many good wagon roads and railways, it is cheaper to carry crops and other products on boats than in cars, and this is often done.

Fig. 48.

A view across the broad Mississippi at New Orleans. The other bank is seen dimly in the distance. A loaded river boat is just coming in, and others are tied up to the levee.

We see, then, why many people have preferred to build their homes near rivers. A farmer prefers to live near a good wagon road, or near the railway station, so that he may easily send his crops away; and, for the same reason, people have always liked to live near a river, which is a good road or *waterway*. It is partly on this account that many of the large cities of the world stand on the banks of large rivers. Do you know of any such cities?

Rivers are also of value for navigation.

Review Questions. — (1) Describe a stream that you have seen. (2) What are rapids and falls? (3) Describe a small stream in the mountains. (4) What does it do with the rocks in its way? (5) What are tributaries? (6) Does the current grow more or less swift as one goes further down stream? (7) How does the country change in appearance? (8) What becomes of the pebbles? Why? (9) What is meant by the source of a river? By its mouth? (10) Where do rivers obtain their water? (11) What is a spring? (12) What effect has a heavy rain upon a stream? (13) Why do not large rivers dry up in summer? (14) Why does not sediment sink where the current is swift? (15) What is a flood-plain? Why is it level? (16) Explain how a delta is made. (17) What is a river basin? (18) A river system? (19) Why do plants grow well on the banks of a river? (20) What is irrigation? (21) How are rivers useful for drainage? (22) What is water-power? (23) In what ways is a river a fine road? (24) Give some of the reasons why many cities have sprung up near great rivers.

Suggestions. — (1) After a heavy rain, follow a small stream from its source to its mouth. (2) Throw a chip into the water, and follow it as far as you can. (3) Why are the rocks in river beds usually so smooth and round? (4) If there is a brook or river near you, examine its banks. Is it a tributary of another stream? (5) How deep and how wide is it? (6) Trace a brook to its source, if possible. Find several tributaries. (7) What large river is nearest your home? What are its largest tributaries? (8) What is meant by "up a river"? By "down a river"? By right bank? By left bank? By river channel? By river bed? (9) Find a spring. Why is its water cool? (10) Watch a well that is being dug, to see if underground water is found. (11) Find a flood-plain along the side of a stream. (12) Find a delta. (13) Do you know of a city that gets its water from a river? (14) Make a small water-wheel, and arrange for a stream of water to turn it round. (15) Visit a mill that is run by water-power. (16) Find out more about canals. (17) Make a collection of pictures of rivers, and notice as many things as you can about them. (18) Find some poems describing brooks and rivers. (19) Write a story of a journey from the source to the mouth of a river.

For References, see page 109.

VI. PONDS AND LAKES

RIVERS supply towns and cities with water, and also turn the wheels of factories; but some streams become so low in summer that they lack water for these purposes. To prevent this difficulty men often build dams of wood, earth, or stone across the rivers, and in this way collect sufficient water to make ponds (Fig. 49). When the rivers are high, these ponds are filled, and enough water gathers to last through the dry season.

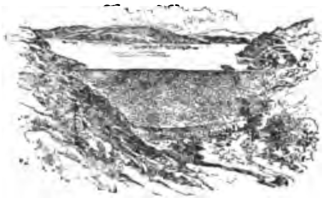


FIG. 49.

A dam of dirt, built in order to form a pond or reservoir.

Probably you have seen such a pond as this. Or you yourself may have made small ponds by building dams of mud or leaves across brooks and gutters (Fig. 50).

Lakes may be made in a similar manner, for they are like ponds, only larger. Sometimes they are several hundred miles in length, and perhaps one hundred miles in width. Some of the largest in the world, the Great Lakes in the northern United States, were made by dams formed ages ago across parts of the great St. Lawrence River system.

Most ponds and lakes have been made in much the same way. That is, the water has gathered behind dams across streams.

But in most cases these dams have not been built by men. Beavers have made a few of them. There used to be a great many of these little animals in this country, and some are still left. Since they prefer quiet, shallow ponds in which to live, they gnaw down trees and build dams with the logs; then they build their homes in the water thus collected.

In other places, where the sides of a valley are steep, great masses of rock and earth have sometimes fallen, in the form of avalanches, and blocked or dammed the streams.

FIG. 50.

A boy building a dam to form a pond in the gutter.

Also it was stated (p. 19) that the earth has been warped or bent upward in some places, forming low ridges, or even lofty mountain ranges. In this way the ground has sometimes slowly risen across river valleys, making high dams; in such cases large lakes have been formed.

There are many other ways in which dams have been built, especially by means of glaciers, which you will study about later.

Most ponds and lakes have been formed by dams across valleys.

Since a lake is generally a part of a stream, it is evident that water must flow into it. The river that flows into a lake is called the *inlet*, and that which flows out is called the *outlet*. There are also many streams entering from the sides. Each of these brings sediment, which settles in the lake, slowly filling it. At first deltas are built opposite to the stream mouths; then, in time, the whole lake is filled and changed to a swamp. Many a swamp is really the last stage in the life of a lake.

The surface of a lake appears to be level; but one part is really slightly higher than the other, otherwise the water would not flow out of it. The higher part of the lake, near the inlet, is called the *head of the lake*, the lower part, near the outlet, the *foot of the lake*. It is correct, then, to speak of going up or down a lake, just as we speak of going up or down a river.

Some lakes have no outlets, because there is so little water that the basin cannot fill up and overflow. This has a very peculiar effect upon the water, for in time it becomes salt. Probably you have heard of the Dead Sea and the Great Salt Lake of Utah. These are salt lakes of this kind, and no one would drink their water, even if he were dying of thirst.

But why do such lakes become salt? There is some salt in all water, even in that which we drink, although so little that we do not notice it. When water flows into a lake, the salt is carried with it. If there is no outlet, the salt can go no further; but each day some of the water is changed to vapor and carried away in the air. As the bits of salt cannot go off in this way, they remain, and increase in number, until, in time, the water becomes so salt that we have a *salt lake*.

Most lakes have inlets and outlets; but some, having no outlets, become salt.

The land at the margin of a river is called the *bank*, but that along the margin of a lake is called the *shore*.

Fig. 51.

A sandy beach on a lake shore.

Sometimes the lake shore is low and wet, being overgrown with swamp plants. Again, it is pleasant to walk upon, being made of sand and pebbles brought there by the waves. This kind of shore is called a *beach* (Fig. 51).

Fig. 52.

A view on Moosehead Lake in Maine. Learn what each of the names means.

Many lake shores are regular, but many more are irregular. In some places points of land, called ***headlands***, extend into the water (Fig. 52). If small, these are called ***points*** or ***capes;*** if large, ***peninsulas.*** A narrow neck of land joining two larger pieces is an ***isthmus.*** Bodies of land entirely surrounded by water are known as ***islands.***

The water that is partly shut in between two headlands is called a ***bay.*** When a bay has deep water, and is so nearly surrounded by land that vessels can enter it and be protected from the wind and waves, it is called a ***harbor.*** A narrow strip of water connecting two larger bodies of water is known as a ***strait.***

Fig. 53.

How many of the features just mentioned can you find in this picture? Find some also on Fig. 60.

When the water gathers behind a dam to form a lake, it enters many valleys, forming bays and harbors, with capes, and perhaps islands between. This is the chief reason for the irregular shores of many lakes. If you will make a little valley in clay, with two or three tributaries entering, then put a dam across it and fill it with water, you will see just how this is done.

The shores of lakes are often irregular, producing bodies of land and water of many shapes.

Ponds and lakes are useful in many of the same ways as rivers. They help to keep the ground moist; they furnish water to cities, and they supply water to turn the wheels of factories. Beside this, many valuable fish are caught in lakes, and much ice is cut from their surface.

Again, like rivers, lakes are important waterways. Upon large lakes, like the Great Lakes, hundreds of vessels are going and coming, carrying men, grain, coal, lumber, and countless other things. On this account many people have settled on the shores of large lakes; and, as a result, many towns and cities have been built there. Do you know of any?

The shores of lakes are often very beautiful, and many persons go to them in summer to hunt, fish, and canoe. There are hotels there, too (Fig. 52), and some lakes are important summer resorts.

Lakes supply drinking water, waterpower, fish, and ice. They are also useful for navigation and for summer resorts.

How are vessels loaded with goods? And again, how can these cargoes be unloaded? Wagons may be driven beside a railway car, and be filled or emptied speedily. But a large boat sinks down many feet into the water (Fig. 54), so that if it came near the shore, it might strike the bottom and be wrecked.

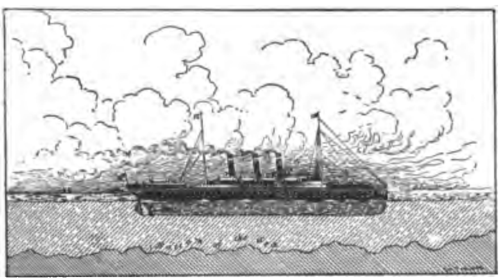


FIG. 54.

A picture to show how deep a vessel sinks in the water.

Fortunately, here and there along the lake shore, there are small bays with deep water. The opening is large enough for vessels to enter easily, but small enough to keep out the fierce waves. Here we have a fine *harbor* (Fig. 55).

FIG. 55.
A small harbor on an island on the coast of California.

From the shores of the harbor men build piers of wood or stone, called *wharves*. These reach into the deeper water, where ships may be fastened or *moored* to them. Wagons can be driven on to the wharves, so that this forms a convenient and safe place for loading and unloading vessels. Such a harbor often determines the location of a city.

Large cities are sometimes found on parts of a lake shore where there are no such natural harbors. In that case harbors have to be *made*, even though it is expensive to do so. Walls of rock, or of posts driven deep into the ground, are built in such a way as nearly to inclose a body of water, very much as capes inclose the water of a natural harbor. Such a wall is called a *breakwater* (Fig. 56), because it breaks the force of the waves, and prevents them from entering the space behind.

When a harbor is not deep enough for vessels to enter, it is necessary to dig out the dirt and rock from the bottom. This is quite often done in the inlet and outlet streams at the ends of a lake.

Harbors are places where vessels find safety from storms and where cargoes are loaded and unloaded with ease.

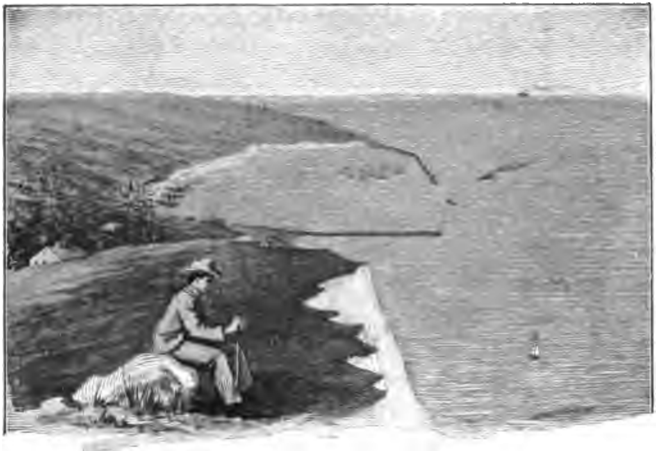


Fig. 56.

A breakwater built in a place where the coast has no natural harbor.

Review Questions. — (1) Why are dams built in rivers? (2) Explain how ponds are made. (3) How do lakes differ from ponds? (4) How are lakes made? (5) Tell what you can about beaver dams. (6) In what other ways may lake dams be made? (7) What is the inlet of a lake? The outlet? The head? The foot? (8) How does it happen that some lakes have no outlet? (9) What about the water then? Why?

(10) What is meant by shore? By beach? (11) What do you understand by a *regular* lake shore? (12) Make a drawing of a cape; peninsula; isthmus; island; bay; strait. (13) Tell in words what each of these is. (14) What is the cause of these irregularities? (15) Mention a few uses of ponds and lakes. (16) What is a harbor? (17) Why must the water be deep? (18) How can a harbor protect ships from storms? (19) What is a wharf? (20) How are harbors often made? (21) What is a breakwater?

Suggestions. — (1) Build a dam in some small stream and note how rapidly the water collects. (2) Find out more about beavers. (3) Look for a pond or lake and examine the dam that caused it. (4) See if there are both an inlet and an outlet. (5) Walk up the

lake; walk down the lake. (6) Examine the shore and notice the different forms of land and water. (7) Find a small harbor. Would every bay make a good harbor? (8) Make a small, irregular hollow in clay and fill it with water to form capes, harbors, and islands. (9) Find some of these in the pictures and maps of this book.

(10) How do men get ice from a lake? (11) In what ways do men catch fish? What kinds of fish have you seen caught? (12) Find pictures of good harbors. Look for the wharves and the breakwater. (13) Build a breakwater to form a iittle harbor in a small stream or pond. (14) Find just how many feet some of our largest ships sink into the water.

(15) Walk toward the nearest large lake. What are some of its tributaries? Where is the inlet stream? The outlet? What are their names? (16) Name some cities that are on lake harbors. (17) Write a story telling what you would expect to see along a lake shore.

For REFERENCES, see page 109.

VII. THE OCEAN

THE great rivers, starting as tiny brooks, grow into larger and still larger streams, until, after days and perhaps weeks, they mingle their waters in the ocean. No doubt much of the rain falling in your neighborhood finally reaches the sea in this way; and if you could float along upon it in a light boat, in time you too would reach

FIG. 57.

A view of the great ocean. Notice the sailing vessel in the distance on the right-hand side.

the ocean. How large is this body of water, and what are some other interesting facts about it?

We can see across most lakes, and can sail across even the largest in a day or two; but the ocean is far larger. One could sail upon it in the same direction for many days without coming to land (Fig. 57). It is so great that it surrounds all the land on which people live, and no matter in which direction you might travel, if you went far enough you would come to it.

If you were to start out to reach the ocean, the journey might last many days. It might be necessary to go up hills and across valleys, to pass around lakes, and possibly over great ranges of mountains. You would be surprised to find how much land there is, and how many farms, villages, towns, and cities there are.

But there is far more water than land. In fact, the water covers about three-fourths of the earth's surface and the land only one-fourth. If one were to travel entirely around the earth, he would probably spend much more than one-half of his time upon the ocean.

The ocean is so immense that the great rivers in all parts of the earth pour their water into it. Their mouths may be thousands of miles apart, yet the sea stretches far enough to reach them all.

The water of the ocean is too salt to drink; but river water is fresh. Since there are many thousands of rivers entering the sea, would you not expect that their water would make the ocean less salt? It does do so near the mouths of great rivers; but soon it becomes mixed and swallowed up in the salt water. This is another way of showing the size of the ocean, for all the river water that enters it is not enough to make it fresh.

The salt water of the ocean surrounds all the land.

Different parts of the ocean have different names. For instance, the *Atlantic* Ocean is the part lying between the United States and the land called Europe, where the English, German, and other peoples live. We buy many articles from these countries, such as woollen cloth, knives, oranges, and olives; and they likewise purchase other articles from us, such as wheat, cotton, and meat. The way to reach these people is to cross the Atlantic Ocean. The fastest steamers need five or six days for the voyage.

In all parts of the earth, the ocean is a great highway. It is so large that thousands of ships are travelling upon it in all directions,

carrying people, cattle, grain, fruit, iron, different kinds of machines, and many other things. Although there are so many ships, the ocean is so large that one ship may sail for days without seeing another.

Ocean navigation is therefore a great business, and many thousands of men are engaged in it. Most of the ships used are larger than the vessels upon lakes, and they sink deeper into the water (Fig. 58). Very large ones, when loaded, reach down about thirty feet below the surface.

FIG. 58.

A large ocean steamer, one that sails between the United States and Europe. See how small the men appear.

Of course the ships meet with storms upon the ocean, as upon lakes. In fact, the ocean waves are at times so high that they sweep over and almost cover up the largest vessels (Fig. 59).

The coast of the ocean resembles the lake shore in having capes, peninsulas, islands, isthmuses, straits, and bays (Fig. 60). We have learned (pp. 19 and 32) that the land in places has been raised or lowered. When it is lowered near the seacoast, the water enters the valleys

and partly drowns the land, as it does in lakes (p. 57). This of course makes an irregular coast.

Fig. 59.
Ocean waves during a storm.

Naturally, on such an irregular coast there are harbors which large vessels enter, and in which they are safe from storms. For example, New York harbor is so broad and deep that hundreds of ships (Fig. 61) are found in it at all times, either loading or unloading their cargoes, or waiting for storms to pass.

Fig. 60.
A picture of Castine harbor on the irregular coast of Maine. Here the land has been lowered so that the salt water of the ocean has entered the valleys, covering their bottoms, but leaving the hill-tops as islands, capes, etc.

Goods are brought to New York, not only from Europe, but also from China and Australia, and in fact, from all parts of the world. It is quite possible that the tea and coffee which are used on your table, and the bananas and pineapples which you have eaten, were brought over the ocean and unloaded in this harbor. If not, they were unloaded in some other fine harbor, such as Boston, San Francisco, or Philadelphia.

Since the ocean easily connects such harbors with all parts of the world, it is natural that great cities should

FIG. 61.

A view among the ships along the wharves of New York Harbor. The great Brooklyn Bridge is seen behind the masts.

spring up where the best ocean harbors are found. It is partly on this account that New York, Philadelphia, Boston, and San Francisco have become such large cities.

Vessels come toward these *seaports* from all parts of the world: but it is often difficult to tell just where to enter the harbors, especially at night. Ships are in danger of going out of the way, and of running upon rocks, or *reefs*, in the shallow water near the coast (Fig. 62). On that account, tall lighthouses are built on many

FIG. 62.

A vessel wrecked by running aground upon a shallow reef.

islands and capes, so that captains may know by their lights which way to go in order to enter the harbors (Fig. 63).

The ocean is a great waterway, connecting different parts of the world.

Not only are goods carried on vessels, but many men go out in them, often out of sight of land, in order to catch the fish which live in such great numbers in the sea. Instead of hooks and lines, long nets are often used, and in them so many fish are caught that

FIG. 63.

A lighthouse on a rocky point. A bright light is placed at the top of the tower so that it may be seen far away.

the vessel is loaded down with fish. No doubt some of the mackerel that you have eaten have been caught in this way. Picture 67, p. 73, shows a vessel that is used to catch ocean fish.

In summer the ocean shore is cooler than the land far away from the sea. This is because the air is cooled as it passes over the water. Many people therefore go to the seashore to avoid the hot weather, just as others go to the mountains. Here they spend day after day climbing about over the rocks or walking upon the clean,

Fig. 64.

Old Orchard Beach on the New England coast. Notice the large number of summer visitors strolling over the cool, hard beach, or bathing in the shallow water.

sandy beach, breathing the fresh air, enjoying the beautiful scenery, and bathing in the cool salt water (Fig. 64).

On this account many houses, and even towns, have been built at those places along the seashore where people wish to spend their vacations. There are large hotels to accommodate the visitors; and in the summer these places are crowded; but very few people remain at the *summer resorts* during the winter.

There is another way in which the ocean is even more useful to man. It is the sea-water which supplies us

with moisture, so that there can be rain. If it were not for the great ocean, very little rain would fall. So every one is deeply indebted to the ocean, even though he may live thousands of miles from it. Soon you will learn (p. 74) how its water reaches us in the form of rain.

The seashore is a popular summer resort; the ocean water supplies food and makes rain possible.

Rivers, lakes, and the ocean present many beautiful views. You may have observed that in cities, where people plan for fine parks, they arrange, if possible, to have a lake or stream as part of the scenery. A body of water, even if but a brook, greatly improves a view.

FIG. 65.
A quaint New England bridge across a beautiful brook.

A brook is a beautiful object (Fig. 65). How pleasant to see its green banks, to listen to its rippling waters, and to watch its tiny rapids, whirlpools, and falls, as it travels onward to the ocean!

Rivers are not less attractive; like the brooks, their rushing waters seem to tell a story, and one loves to linger by them, to listen and to look. At times, when swollen by floods, they are wild and savage; again they are quiet, peaceful, and beautiful. They wind in and out among the steep and wooded hills; now they flow along noiselessly, then they rush over rapids and falls with a roar; here their banks are low and green, there they are high, steep, and rocky.

The lakes and the ocean are sparkling sheets of silvery water, often dotted here and there with white sails. Sometimes the color is green, again it is blue; and when the clouds hang over it, it is dark and

gloomy. There are beautiful sunrises and sunsets to watch; and one can see the storms come and go, with the waves dashing into the whitest of foam. In fact, the water, the sky, and the coast are always changing in appearance, so that the lake shore and the seashore are among the most attractive of places.

The land and the water together furnish many beautiful views.

Review Questions. — (1) What place does the water of brooks and rivers finally reach? (2) How much of the earth's surface is water? (3) What other facts show that the ocean is very large? (4) Tell about ocean navigation. (5) What is the cause for irregular ocean shores? (6) Tell what you can about New York harbor. (7) Why are large cities found on the fine ocean harbors? (8) Of what use are lighthouses? (9) Name some foods obtained from the ocean. (10) Why do many people go to the seashore in summer?

(11) Do you know of any park or meadow with a stream or lake in it? If so, describe it. (12) Did you ever enjoy watching the water? Where was it? (13) How does the surface of a lake or ocean change at different times?

Suggestions. — (1) In what direction would you go to reach the ocean? How far is it? (2) Find pictures of large harbors with ships in them. (3) Name several seaport cities. (4) Have some one tell you about a journey across the ocean. (5) Name as many articles as you can that come from over the ocean. (6) How does the captain of a vessel know in what direction he is going, after losing sight of land? (7) How are ships made to move through the water? (8) What use is made of whales? (9) Find out how fish are caught. (10) Ask some one who has visited a summer resort on the seashore to tell you about it. (11) Is there any brook or river that you enjoy visiting? Where is it most beautiful? (12) Tell about some of the storms on the ocean described in Robinson Crusoe. (13) Do you know of any views that are made more beautiful by the presence of water? If so, where are they? Describe them. (14) Collect, from magazines, pictures of beautiful views with water in them. (15) Write a story, telling what you would expect to see in crossing the ocean. (16) Make a drawing of a ship.

For References, see page 109.

VIII. THE AIR

Since air cannot be seen, people often forget that it really is something; but a fire will not burn without it, and plants, animals, and men must have it to breathe. In fact, drowning means nothing more than sinking under water, where there is not enough air to breathe.

This is proof that the air is really something, even though it cannot be seen; and you can prove the same thing in other ways. For instance, if you stand with your face to a breeze, you feel the air moving. Sometimes this movement of the air, which we call *wind*, is so rapid that it blows down trees and houses.

Here is an experiment to prove that the air is something and that it fills space.

Find an empty bottle without a cork and sink it in water with the open end up. Notice the gurgling noise as the bubbles of air rise to the surface, while the bottle slowly fills. Where does this air come from? And why does not the bottle fill more quickly? You see that although we called the bottle *empty*, it was really filled with air which could not be seen. The water could not enter the bottle until it pushed the air out, because the bottle could not be filled with two substances at the same time. So, as the air was leaving, the water was entering.

If the bottle is turned bottom upward, and pushed perfectly straight into water, the air will be given no chance to slip out, and then the bottle cannot be filled with water.

Air is something real and occupies space.

There is air all around the earth, and it extends many miles above us. This air, often called the *atmosphere*, is

usually in motion, now in one direction, now in another, and it often moves fast enough to cause a breeze, or wind.

Even when the wind is not blowing near the ground, it may be doing so far above, where the clouds are. You can see that this is so, if you watch the clouds as they are driven along by the winds.

Let us see what causes the air to move. Heat has much to do with it. If you watch smoke in a room where there is a lighted lamp, you will see that it moves toward the lamp, and then rises above it (Fig. 66). Hot air also rises above a stove, or above a furnace through the registers; and during the winter, when there is a hot fire, the air near the ceiling of a room is much warmer than that near the floor.

Fig. 66.
The smoke of a cigar rising from the table above the lighted lamp.

The reason for all this is, that when air is warmed, it is expanded and made lighter. Light objects, such as wood, will rise and float in water. So, also, when air is warmed and made light near a lamp, the cooler, heavy air all around flows toward the lamp and the warm air is forced to rise. It is, in fact, pushed up by the current of heavy, cool air.

Now we can understand the cause of winds. The at-

mosphere in one place, perhaps to the north of you, is colder than that where you are. This cold air, being denser and heavier than the warm air, begins to push it away, and thus moves toward you, forming a cold north wind.

People on the sea or lake shore often have such winds in summer, when, during a hot day, the air over the land becomes heated, while that over the water remains cool. The cool air then commences to move landward, and a cool sea breeze begins to blow.

Whenever the air is heavy in one place, and light in another, winds will blow toward the place where it is light. Since this lightness of the air is *usually* caused by heat, we say that

Most winds are caused by differences in the temperature of the air.

Winds are useful in many ways. They drive sailing vessels through the water, and they turn windmills (Fig. 68), which are often used to pump water from wells. But what is most important, they carry water all over the earth. At all times there is enough water in the atmosphere to fill many large lakes.

FIG. 67.

A sailing vessel driven through the water by the wind. This is a fishing schooner going out of the harbor of Gloucester, Massachusetts, after a load of fish.

You know that there must be some water in the air, for wet clothes hung out on a line become dry as the water passes off into the air.

FIG. 68. A windmill.

Some of the water in the atmosphere enters it after every rainstorm, when the muddy roads and wet fields are drying; but most of it comes from rivers, lakes, and the ocean. We have already learned (p. 63) that the ocean covers about three-fourths of the surface of the earth. The air is taking water from all parts of it, so that each minute enough water to fill thousands and thousands of barrels is leaving the ocean and floating away in the atmosphere.

Another reason why we know that there must be much water in the air, is that much comes out of it in the form of rain, snow, hail, dew, and frost.

The air takes up water from one place and holds it, perhaps for many days, during which time the winds may have carried it hundreds of miles; it may then be allowed to fall. Thus it is by the help of the wind that rocks are wet and caused to change to soil, plants are made to grow, rivers are furnished with water, and animals and people are given water to drink.

Persons living where there is plenty of rain perhaps do not realize how important it is; but there are some parts of the earth where the air is so dry that very little rain can fall from it. In these places, called *deserts* (Fig. 69), only a few kinds of plants and animals can live, while men generally avoid them.

The air obtains water from the ocean, and the winds carry it about.

What causes water to rise into the air? And why can we not see it there? If you watch a boiling kettle, you will see that "steam" rises from it. In a short time all the water will be boiled out of the kettle, passing into the air, where you can no longer see it.

The water in the kettle was a *liquid*, which could be seen; but heat has changed it to a *gas*, which, like air, is colorless and cannot be seen. Then, too, it is so light that it floats

Fig. 69.

Camels crossing the desert. Notice how barren it is.

round in the air. This water gas is called *water vapor*, and the change from liquid water to vapor is called *evaporation*.

It is not necessary to boil water to make it evaporate; for all over the earth, where there is water, vapor is rising from it into the air. You can prove this for yourself by placing a pan of water on a table and leaving it for some days, and then noticing how much of it has evaporated. It is in this way that the great amount of water, which every moment is rising from the ocean, is able to pass into the atmosphere.

Water vapor is obtained by evaporation.

When it falls from the sky as rain, the water vapor has changed back to liquid water. What causes it to do this?

Have you ever noticed a glass or pitcher of ice water "sweat" on a hot summer day (Fig. 70)? The water that collects on the glass has not leaked through, for there are no holes in the glass. What has really happened is that the air near the dish has been cooled so that the vapor in the air has collected in drops on the cold surface of the glass. Drops would gather there just the same, even if no water were in the glass, provided the surface remained just as cold.

FIG. 70.

Little drops of water condensed from the vapor of the air on the outside of a glass of cold water.

On wash day, when a great deal of water vapor rises from the boiler, the windows are often covered with drops of water, because the vapor has been changed back to liquid, or *condensed*, on the cold window pane. Your own breath contains vapor, and you can change it to water by breathing on a cold window pane. So you see that if air loaded with vapor is cooled, some of the vapor gas is changed back to water.

There are several ways in which air may be cooled. You know that mountains are colder than the lower lands (p. 20); so that winds blowing over them are often chilled, and their vapor condensed. It is evident from this that mountains are an important help in causing rain

Vapor may also be condensed when a cold wind blows against a warm one. Again, during summer the sun may shine down so hot that the air near the earth becomes warm. This makes it so light that it often rises high into the sky, where the air is so cold that the vapor condenses into rain. The summer thunder showers, which often come on hot afternoons, are caused in this way.

Vapor is condensed by the cooling of the air.

FIG. 71.

Clouds formed upon the mountain sides because the air has been chilled.

There are several different forms of condensed vapor. When you breathe into the air on a cold, frosty morning, your breath forms a little *fog* or cloud. The cold air has made the vapor change to tiny particles of water, so small that you cannot see a single one, though many of them together make a thin mist. You have no doubt seen fogs in valleys, on lakes, or over the ocean. These are always made of tiny drops of water condensed from vapor in the air.

Most *clouds* are also made of tiny fog and mist particles. These, too, are caused by the cooling of the air,

sometimes when it moves against mountain slopes (Fig. 71), sometimes when cold winds blow against warm ones, and sometimes when warm air rises high in the heavens and becomes cool (Fig. 72).

FIG. 72.

A summer cloud, often called a "thunder head," formed by the rising of warm air to such a height that the vapor is condensed.

Another form of condensed vapor is the *raindrop* which falls from the clouds. These drops begin as tiny mist or fog particles, and then, becoming larger and larger, grow so heavy that they can no longer float, but must fall to the ground.

We have seen that water may be either a liquid or a gas. There is still another form, the *solid*, which is produced when vapor condenses in a temperature below 32°, or the freezing point. Then *snow* or hail is formed instead of rain (Fig. 73).

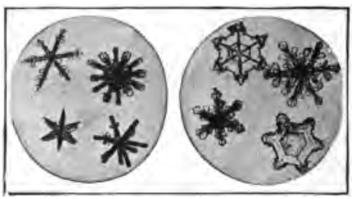


FIG. 73.

Photographs of snowflakes. Sometime, when light, feathery snow is falling, notice what beautiful forms it takes.

At night, drops of water often collect on the cold ground, on grass and leaves, somewhat as it does on an ice pitcher or the window pane. This is *dew*, which gathers because the ground cools quickly after the sun sets, so that the warm, vapor-laden air is chilled until the vapor is condensed.

If the temperature is below the freezing-point, *frost* is formed instead.

You will notice that raindrops, fog particles, and snowflakes form in the air, while dew gathers on grass and the drops of water on window panes. Really the raindrops and fog particles also gather on solid substances; for there are many tiny, solid particles of dust floating in the air, which you can often see dancing in a beam of sunlight, and it is around these that the rain, fog, and snow form.

It is condensed vapor that forms fog, mist, rain, snow, hail, dew, and frost.

Usually winds from certain directions, as from the ocean, are liable to bring rain, while others indicate fair weather. By keeping a daily record of the direction of the wind, and of the kind of weather it brings, you will be able to find out for yourself which of your winds cause fair weather and which rainy. You might also look at the thermometer at the same time and note the temperature. By these means you can learn something about the weather around your home. A record of this kind, which would be called a *weather record*, might be kept somewhat as follows:[1]

Date and Time of Day.	Direction of Wind.	Kind of Weather.	Temp.
Aug. 17, 1899, 8 A.M.	Southeast.	Cloudy.	70°
Aug. 17, 1899, 8 P.M.	Calm.	Gentle Rain.	72°
Aug. 18, 1899, 8 A.M.	West.	Clear.	68°

[1] If it is practicable, the teacher should at this point introduce an elementary study of weather maps and have the pupils read them each day.

Review Questions. — (1) Of what use is air? (2) How can you prove that air is something? (3) Describe the experiments with the bottle. (4) What do they prove? (5) What are winds? (6) Prove that there are winds high above the ground. (7) Why does the air rise over a lighted lamp? (8) What causes winds? (9) In what ways are winds useful? (10) How can you prove that there is water in the air? (11) Where does most of it come from? (12) What do the winds do with this water? (13) Of what service is the rain? (14) What becomes of water as it boils? (15) What is water vapor? (16) What is evaporation?

(17) What happens to vapor when cooled? (18) Tell some ways in which you can see condensed vapor. (19) In what ways can the vapor in the air be condensed? (20) Why can you "see your breath" on cold mornings? (21) How are clouds formed? (22) How cold must it be to form snow? (23) How is dew caused? Frost? (24) Of what importance are the dust particles in the air? (25) Tell how you would keep a weather record.

Suggestions. — (1) Why are stoves made so as to let in air for the fire? (2) What becomes of the air after it enters? (3) How does air reach the wick of a lamp? (4) Try a common drinking glass, instead of a bottle, to show that air takes up space. (5) Heat some muddy water and watch its movement. (6) Why does smoke go up, and not down, the chimney? (7) Show how a hot stove causes a movement, or circulation, of the air in a room. (8) Find out how your schoolhouse is ventilated. (9) How many examples can you give of evaporation of water? (10) Cool a piece of glass or iron and notice the vapor condense upon it, when the air is "muggy" or when steam is passing into the air. (11) Why do clouds frequently surround mountain tops? (12) See how early in the evening the dew begins to collect upon the ground. (13) What causes fogs to disappear? (14) Which winds usually bring rain to you? (15) How far have they probably carried the vapor? How long would it take them to do this, if they travelled at the rate of eight miles per hour? (16) Write a story, giving the history of a raindrop.

For References, see page 109.

IX. INDUSTRY AND COMMERCE

Every man is expected to engage in some kind of work, or *industry*, in order to earn a living. For instance, farmers raise stock and grain, while gardeners produce vegetables and fruit. The crops they raise vary with the locality.

Some men, instead of working in the soil, are engaged in manufacturing such articles as shoes, cloth, and materials used in building and furnishing houses. Are there any of these men in your vicinity? If so, what do they make? You can at least find a blacksmith shop, or a tin shop, or a house that is being built. Notice how many different materials are used by the workmen.

Storekeepers do neither of these two kinds of work. What, then, do they do? Notice how many articles the grocer keeps in his store, also the dry-goods merchant, and others whose stores you visit. Where do they get them all?

At the present time it is easy, where most of us live, to buy almost anything, and to find men who can do almost any kind of work. We are so accustomed to all this that we are apt to forget that it has not always been so.

Not many hundred years ago there were no stores or houses in this country; and each family, as it settled here, was obliged to find its own food, make its own clothing, and build its own house.

Let us study more fully how people lived in those days, and how changes have gradually been made until the present manner of living was reached.

The first persons who left Europe, and crossed the Atlantic Ocean to live in this country, naturally settled along the coast, because that was the first place reached.

But soon men began to push into the wilderness further west. Often several families settled together, miles away from other people. Sometimes a single family would go off alone, and make a home ten or twelve miles from the nearest neighbor. Most of the United States was first settled by these scattered *pioneer* families.

Of course when a man started out he took some articles with him, as a gun, with powder and bullets, some clothing, and some blankets; but upon arriving at his new home he was obliged, like Robinson Crusoe, to rely upon himself.

FIG. 74.

A log house, such as the pioneers used to build in the forests.

In 1816, when Abraham Lincoln was seven years of age, his father moved to Indiana. He had to cut down trees in order to make room for a house, which he built of logs with mud between the cracks (Fig. 74). It had no floor except the earth, and only one room. Abraham slept in the loft, climbing up each night by pegs fastened in the logs. The beds were some posts driven into the ground with cross-pieces; the chairs were three-legged stools, and the table was a part of a log supported upon four legs. When a young boy, Abraham wore trousers of deerskin, and when he was not barefooted he probably used moccasins for shoes.

His father raised enough corn for corn bread; their tea was often made from roots in the forest, and meat was obtained by shooting wild game. Abraham was very fond of books; but at night he read by the light of burning wood, for he had neither candle nor lamp. He wrote with ink made from brier-root, and with a pen made from the quill of a large feather. Almost everything that the family used was raised or made by the father and mother, so that they had to do many kinds of work.

Other pioneers lived in much the same manner. Usually they raised their grain and wheat for bread. They kept sheep and made the wool into yarn, blankets, and cloth. If a boy needed a new suit of clothes, his mother would make the cloth, cut it, and sew it. They were obliged to do nearly everything for themselves.

As a rule, each man raised more of some things than his own family could use, as wheat, wool, or hogs; but there were others that he had to buy, as powder, sugar, salt, pepper, and coffee.

It was the custom, therefore, to drive two or three times a year to the nearest large town, perhaps a hundred miles away, taking the products of the farm and exchanging them for necessary articles.

These trips had to be few, for the roads were often rough, muddy, and dangerous. It might require two weeks or more to haul a load of grain to town and bring back the coffee and other materials the family wanted. In parts of the world, where there are few settlers, people are still living in this manner.

But one family did not usually live long alone, for soon others came and settled near them. Perhaps several built their houses near together, forming a little village.

Now that there were more people, the kind of work

that each did began to change. Perhaps one of them built a saw-mill, and sawed lumber for the others when they needed it. Another spent part of his time at carpentry work for his neighbors. A third built a grist-mill, and occasionally ground grain into flour. A fourth made shoes, or clothes, a part of his time, or he doctored the sick, or preached, or taught school.

Perhaps the blacksmith spent all of his time in his shop, shoeing horses, making ploughs, etc., while the storekeeper did nothing but buy and sell goods. He went to the city and bought the supplies that he thought his neighbors would need, such as matches, boots, shovels, calico, and drugs, and these he kept in his store for sale.

It was not then necessary for the farmer to go to the distant town, because he could usually find what he wanted at the store; and if he raised more potatoes than he needed, he could take them to the storekeeper and get coffee in return. Or he would receive money for them, and with this pay the blacksmith who had shod his horses, or the doctor, or teacher. In many of the less settled parts of the country this is the way people are still living.

Each year more people took up land, until most of it was carefully cultivated, and towns and cities grew up (Fig. 75). Then they began to live in the way that is now so common. That is, each man now confines himself to one or a very few kinds of work, and depends upon other men for the other things that he needs. Those who live in the country are chiefly farmers, and raise the food that we eat. Others work in mines, digging coal, iron, lead, copper, silver, or gold out of the ground.

Many, instead of raising crops or working in mines, are employed in mills and factories. One saws logs into lumber, or makes doors; another manufactures cloth,

another needles, another shoes. Others follow the industry of tailoring, tanning hides for leather, making clocks, etc.

Still others are engaged in a third kind of work. They do nothing but buy and sell such articles, and among these are all the merchants that we see in the stores.

Under these conditions the work that one man does is not only of one kind, but it may be of a very narrow kind. For example, a man may do nothing but drive a team. Or he may make shingles, or drive nails, or tie up sacks of flour, or put in the heads of barrels. How different this is from the work of the pioneers!

FIG. 75.

The city of Rochester, in New York, has grown up near these beautiful falls on the Genesee River. Some of the factories that use the water power are seen in the picture.

As a rule, each town or city is specially interested in one or a few kinds of business. For example, a town surrounded by extensive woods is likely to have an important lumbering industry. Another, in the midst of mountains, may make mining its especial work; or another, near great wheat-fields, may have immense flour mills.

Thus each town, like each man, is apt to be interested in the production of few things; what they raise or man-

ufacture is sent away in all directions, and the other articles, that the people in the town want, are brought to them from the many places in which they are produced. Find out what is made in your own town, and some of the substances that are brought to it.

When people are so dependent upon others for most of the materials that they use, it is clear that roadways become of great importance. For if the best wheat for flour is raised in Dakota, if the best shoes and cloth are made in New England, and if the thousand other things that we must have are produced in a thousand other places, what good will they do us if they cannot be brought to us?

The pioneers had no roads at first. When Lincoln's father moved to Indiana, he settled fifteen miles north of the Ohio River. There was no road from his place, and one of the hardest pieces of work he ever did was to cut one through the dense forests.

FIG. 76.
A pack train, on a mountain road, carrying supplies to a mine on the mountain side.

One of the early customs was to follow a *trail*, or narrow path, and, instead of using a wagon, to carry goods strapped upon one's own back, or else upon horses or mules. A number of horses carrying packs formed a *pack train* (Fig. 76). Pack trains are still common in some places.

Later, when roads were more common, they were often rough and muddy; and as there were few bridges, streams often had to be waded or *forded*.

A great deal of labor has been spent in making good roads. Not only must trees be cut down and stumps and stones be removed, but steep places must often be levelled. Bridges are also necessary, and much work must be done to keep the roads in repair. In some places where there is much travel, as in eastern Massachusetts, great sums of money are spent in making excellent roads.

FIG. 77.

A long freight train, on the Northern Pacific Railway, crossing the Rocky Mountains. There is another engine in the middle of the train and a third on the rear end.

There is so much carting in cities that their streets must be paved. Bricks are often used; or stones larger than bricks are laid down side by side; and in many cities, asphalt pavements are common. What kind of streets have you seen, and how were they built?

We have already (p. 50) considered the importance of rivers as roadways. When Abraham Lincoln was a young man, it was the custom to carry goods from his section of the country down the Ohio and Mississippi rivers, all the way to New Orleans. These rivers were, in fact, the only good roadways to that great city. The

goods were shipped upon flat-boats, and Lincoln himself made two such journeys.

But railways are, in many respects, the best roads. Even with the finest of wagon roads, people and goods cannot usually be carried more than twenty to forty miles in a day. Boats are somewhat faster; but railway trains travel from four hundred to a thousand miles per day, and they take both passengers and freight much more cheaply than they can be carried in wagons.

Fig. 78.

A view in a freight depot at St. Paul, Minnesota.

As we ourselves travel on passenger trains, we are inclined to think that the chief business of railways is to carry people; but this is not generally the case. Their main business is to carry freight, such as grain, cattle, groceries, and machinery; and by doing this they have had a great influence upon the development of the country.

For example, a few years ago it would have done little good to raise sheep, wheat, and fruit in the far west, because they could not be sent to the great cities to be sold; but since the railways were built, these industries, and

many others, have become of great importance. There is therefore much more buying, selling, and carrying — that is, much more *commerce* — than before the railways were built.

Fig. 79.
A freight yard with many freight cars.

Letters, newspapers, and express packages are now carried very rapidly on the trains. Formerly they were sent in stage coaches or on horseback; but now many passenger trains have one or two cars used for these purposes alone.

Fig. 80.
A view in New York harbor showing the vessels coming and going.

It is clear that good roadways, whether made of soil, water, or iron, are a great help to trade. In fact, without them there could be very little commerce. The wagon

roads in the country and city are of great value in carrying goods for short distances as, for instance, to the river wharf or the railway station. Then boats and trains are used to carry them further.

Not only is there commerce on the land, but, as we have already seen (p. 64), thousands of vessels are engaged in carrying freight on the ocean. They are constantly passing up and down the coast of the United States, going from one city to another (Fig. 80) with loads of cloth, iron, grain, lumber, and hundreds of other articles.

Vessels are also going and coming at all times between the United States and foreign countries, bringing materials which we need and taking back some of our products. This is known as *foreign commerce.*

REVIEW QUESTIONS. — (1) What do merchants do? (2) Who are pioneers? (3) Describe the house in which Abraham Lincoln lived when a boy. (4) Mention some of the different kinds of work that his father and mother had to do. (5) Tell about the trips to the nearest large town.

(6) How did the work of each man change when the people began to live in villages? (7) Give some examples. (8) What would you expect to see in a general store? (9) Make a list of articles that are manufactured. (10) Name several industries. (11) How has the work of each man changed as great numbers of them have settled together? (12) In what ways have men become dependent upon one another? Give examples.

(13) Show that roads are of great importance. (14) What kind of roads did the early pioneers have? (15) How did they cross the streams? (16) Why must streets in cities be paved? (17) In what respects are railways better than other roads? (18) Tell how railways have helped to develop our country. (19) What is meant by commerce? (20) By foreign commerce?

SUGGESTIONS. — (1) Make a list of the crops grown in your neighborhood. How is the work done? (2) Do the same for manufactured

articles. (3) Have you read the life of Daniel Boone, the pioneer? (4) What were some of the things Robinson Crusoe had to do for himself? (5) Write a story describing an early pioneer's journey to the nearest large town. (6) Read more about the boyhood of Abraham Lincoln.

(7) Visit a general store in the country. (8) Visit a factory, a blacksmith shop, or a mill. Describe the visit. (9) Make a list of articles that you use which were probably brought from a distance on the railroad or on water. (10) Find out where some of them came from. (11) What is meant by a ford? The last syllable in the name of a great many towns is *ford*, as Hartford, Stamford, and Rockford; what does that suggest to you? (12) Visit a street where pavement is being laid. (13) Have improvements been made in any river near you?

(14) What freight goods have you seen carried on the nearest railway? (15) Visit a freight house to see what is inside. (16) Find out where the boxes, etc., come from. (17) Count the number of freight cars and of passenger cars that run over the railway during one day. (18) Name as many substances as you can that come from over the ocean. (19) Write a story giving the history of the material of your dress or coat; of your shoes. (20) Find out some facts about bananas as, for instance, where they are grown and how they are brought to you. Do the same for coffee, tea, sugar, and other articles of food.

For REFERENCES, see page 110.

X. GOVERNMENT

EVERY boy and girl has heard men talk about *voting*, and has noticed how interested they often become as election time approaches.

But do you know what voting is for? Do you know why the day for voting is called *election day?* Find out what you can about voting and election.

Laws and *officers* are frequently mentioned when men are talking about election. Can you name some laws; and do you know any officers? You have certainly seen a policeman: what does he do? You have heard of judges, and of the President: can you state anything about them? Can you mention any other officers?

In our study of commerce we saw that it required a long time to reach our present way of living and carrying on trade. So it is with our government. At present we have many laws and officers, while long ago there were very few of each. Let us see why this is so.

The farmer manages his farm nearly as he pleases. He puts up fences, sells his grain, or feeds it to stock, as seems to him best; and when repairs are needed, he looks after them himself. The miller builds a large or small mill, uses old or new machinery, grinds much or little corn, and makes repairs, as he chooses. In each case, one man owns and uses the property.

But there are some things that no one man owns and that all wish to use. This is true, for instance, of roads.

All people drive or walk over them, yet they belong to no one person. Who, then, should build roads in the first place, and who should make necessary repairs on them?

This was one of the first questions that the pioneers of New England had to answer. The best way they saw of doing it, was for those who used the roads in a small section to meet together and decide, or *vote*, as to what should be done. That is, they made rules or *laws* about the roads; then they *elected* men who should make it a part of their business to see that the roads were built, and that repairs were made, according to these laws. Such men were known as *officers*.

Schools also are not owned by one person, and yet many wish to use them. Large yards, good buildings, and good teachers are all desirable; but who should provide for them? The pioneers of New England settled this matter also by voting and by electing officers to see that the schools were properly managed.

Many other important matters were attended to in much the same manner. For example, there are usually some persons in every community who are liable to take things that do not belong to them, or who are noisy and quarrelsome. The pioneers passed laws in regard to such offenders and elected officers, called *constables*, to arrest them when necessary.

Thus far we have been considering only matters which could be settled by a small group of people living near together in a *village* or small *town* (Fig. 81). But there are some matters that cannot be settled in this manner, because other people, living far away, are also interested in them.

For example, the managers of a railway company may charge too much for passengers and freight. In such cases laws may need to be passed, compelling them to charge reasonable rates. But as these railways are scores,

or even hundreds, of miles long, the people of a single town could do very little with them. In that case it would be necessary for those living perhaps hundreds of miles apart to unite in some way in order to make laws.

Again, it is important that there be buildings in which blind people may be properly cared for, in which the deaf and dumb may be educated, and insane people confined. There must also be strong prisons where criminals may be sent. But in any one town there are not many such persons, and it would prove very expensive to take proper

FIG. 81.

A small New England town, nestled in a valley among the hills, fields, and forests. Tell what you see in this picture.

care of only a few. This is another reason why a number of people should unite to make laws on some matters.

We have seen why there must be a town government, and now we see why there must also be a *state government;* for a *state* is nothing more than a large section of country in which all the people unite to make and enforce laws.

All the men of a state cannot assemble at one point, from a distance of one or two hundred miles, in order to attend to such matters. Even if they could make the journey at the time appointed, there would be so many of

them that they could not hear one another speak, and little business could be carried on.

For these reasons it is necessary for one man to be elected to *represent* many others. Where there are a great number of people, he may represent many thousands.

Suppose, for instance, that there are a million people living in a state and that one man is elected to represent every ten thousand; there will then be one hundred such men chosen, and it will be their duty to meet together to make laws for the whole million.

Such men, being chosen to represent the others, are often called *representatives;* and because they *legislate* (which means "make laws"), they are together called the *legislature.*

FIG. 82.
The state capitol of Indiana at Indianapolis.

In order to meet together, these men must assemble in a certain place, and that place is called the *capital* (*capital* means head city) of the state. This is a city, often near the centre of the state, in which there is a fine building, called the *state capitol* (Fig. 82), where the representatives hold their meetings.

We saw that in the town the people not only made laws, but elected men to see that they were enforced. Such men are necessary for the state also. The leading officer, chosen to enforce or *execute* the laws, is the *governor*, sometimes called the *chief executive.*

In large cities (Fig. 83) there are so many people that they must also be governed by representatives, as the people of the whole state are governed. The men who make the laws are often called *aldermen* and *councillors*, and the highest officer, elected to execute the laws, is known as the *mayor*. The building in which these representatives meet, and in which the mayor has his office, is the *City Hall*. While a city is governed by its own officers in some matters, it is still a part of a state, and elects representatives to the state legislature.

FIG. 83.

A crowded street in the great city of New York. Notice the high buildings and busy streets. Many officers are needed in such a city. Indeed, there are more policemen in New York City than there are men, women, and children in some towns.

In our country there are many states, and there are some matters that no one state can decide alone, because all the others are equally interested in them. For instance, it would be a great hindrance to travel and trade if each state made its own money; for then each one might have a different kind, with coins of different names and weights. Every time a traveller passed from the state of New York to Pennsylvania, or Massachusetts, he might be obliged to take the time and trouble to exchange his money for a new kind.

Again, in case of war it would be impossible to make much progress if each state acted independently. Perhaps you can give some of the reasons why. Mail is another matter that concerns all the states, and there are still others besides. Can you mention some?

So it is evident that we need a *United States Government*, as well as state, city, and town governments. The reason for calling it the United States Government is also plain; for the states have really *united* in order to have one central government for some of their most important affairs.

If the people of a single state cannot meet in a body to make laws, certainly those of the entire United States cannot do so. Representatives are elected and sent, from all the states of the Union, to one place where they consider the affairs of the whole nation. The place where they meet is the city of Washington, and it is on that account the *capital of the United States*. Here is a magnificent *capitol* building (Fig. 85) in which the meetings are held; and there are many other great government buildings besides. (See Fig. 85.)

FIG. 84.
A picture of George Washington, after whom the capital is named. Find out what you can about him.

The representatives from all the forty-five states of the Union form what is known as *Congress*. This corresponds to the legislature of the states, the congressmen making laws for the nation, as the legislators do for the state. The members of Congress are called *senators* and *representatives*. The executive officer of the United States, corresponding to

the mayor of a city and the governor of a state, is called the *President*. He lives in Washington, and his residence is called the Executive Mansion, or the White House, since it is painted white (Fig. 85).

Besides these officers who are elected by the people, there are a great many others appointed by the President to carry on the government work. Many live in Washington, but some, as postmasters, live in other places.

We have seen how the people in small towns arrange for their home government, and how, uniting with those in other towns, they elect some men to represent them at the state capital and others to represent them at the national capital. These representatives are elected by means of votes that are cast for them.

Because the people make their own laws, our government is called a *democracy*. The first part of this word means "people," and the last part "government," so that the whole word means "government by the people." Because the people do not make all the laws themselves, but allow their representatives to make them, it is often called a representative government or a *republic*.

It is often said that our form of government makes us free and equal. People are by no means so free and equal in all countries. Under some governments, in Europe and Asia, the people have very little to say about the laws that shall govern them. Nor do the laws protect them all equally, for the high officers say freely what they think, while others do not dare to do this. They must obey their rulers blindly, just as little children are expected to obey their parents.

Such a government cannot be called a democracy or a republic; it is indeed a *despotism*, or an *absolute monarchy*.

Fig. 85.

A group of government buildings at Washington.

This means that the ruler is a *despot*, or a *monarch*, having complete or absolute power to do what he chooses. For instance, he puts men to death without any trial, a thing that the laws of our country do not allow. China and Turkey are examples of this kind of government.

There are other nations in which the people have more freedom than this, but not so much as we have. They are allowed freedom to do some things which they wish, while in other matters they are compelled to obey, without even asking any questions. Spain has a government of this kind. Since the people have *some* rights by which the monarch's power is checked or limited, this government is called a *limited monarchy*. Some limited monarchies, however, like England, allow a very considerable freedom.

REVIEW QUESTIONS. — (1) Name a few things that no one person owns and that all wish to use. (2) How did the pioneers arrange for roads? (3) Why was a constable necessary? (4) What are laws? (5) Why must a great many towns and villages unite in order to make laws? (6) Name some of the objects for which they must unite. (7) What is a state? (8) How are laws made in states? (9) Why are the men that are elected called representatives? (10) What is a legislature? (11) Where does it meet? In what building? (12) Where does the governor live? (13) Why must large cities also be governed by representatives? (14) Name some of the city officers. Where do they meet?

(15) Why should not each state make its own money? (16) Why are these states called the United States? (17) Where do the representatives of the United States meet? In what building? (18) What is Congress? (19) What is the White House? (20) What does the word democracy mean? (21) Why is this government called a republic? (22) How are people in many other countries less free and equal than we are? (23) What is a despotism? An absolute monarchy? Give examples. (24) What is a limited monarchy? Give an example.

Suggestions. — (1) What persons repair the roads or streets where you live? (2) How are they chosen? (3) What officers look after the schools? (4) How is your constable or policeman uniformed? (5) Attend a trial to see how it is conducted. (6) What are taxes? (7) In what state do you live? (8) What is the name of your state capital? (9) How far is it from your home, and in what direction? (10) Who is the governor of your state? (11) If you live in a city, who is the mayor? Where is the City Hall? (12) Ask some friend who has travelled in foreign countries if he had much trouble with the different kinds of money. (13) What does U. S. stand for? (14) In what direction is the city of Washington from you, and how far is it? (15) Who is living in the White House now? (16) Where are the nearest polls for voting? (17) Have some one show you how he votes. (18) What is meant by the statement that a "majority rules"?

For References, see page 110.

XI. MAPS

We often wish to represent a country upon a map so as to tell, at a glance, its shape, and where the mountains, rivers, and cities are located. Such a drawing can be made of any place, no matter how large or small it is.

FIG. 86.

Picture of a schoolroom which is 32 feet long and 32 feet wide.

Suppose we desired to draw only a schoolroom (Fig. 86), which is perhaps 32 feet long and 32 feet wide. It would not be easy to find a piece of paper so large as that, and it would not be necessary to do so. A small piece would do, because 1 inch upon it could be allowed to represent several feet in the room.

In this case let an inch stand for 16 feet. Since the room is 32 feet on each side, and there are two 16's in 32, the drawing will be just two inches long and two wide. To place the desks and aisles properly, we will need to use a ruler divided into sixteenths, for one foot in the room represents $\frac{1}{16}$ of an inch on the ruler.

The ends and sides are marked (Fig. 87) north, east, south, and west. The teacher's desk is $3\frac{1}{2}$ feet in front of the north wall. There is a row of desks about 4 feet from the west wall. The desks are just 2 feet long, with eight in a row $1\frac{1}{4}$ feet apart. There are seven rows; and the aisles between them are each $1\frac{1}{4}$ feet wide. Here is a

map of the schoolroom (Fig. 87). Measure each part to see if it has been drawn correctly, using a foot rule that shows the sixteenths of inches. How large is the desk? The piano?

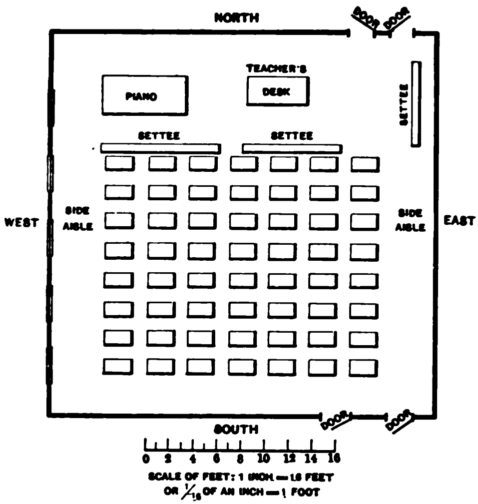


FIG. 87.
A map of the schoolroom shown in Figure 86.

When a person draws in this way, letting a certain distance on the paper represent a much greater one, he is said to use a *scale*, or to make a map *according to a scale*. In the schoolroom just described (Fig. 87), the scale is 1 inch to 16 feet.

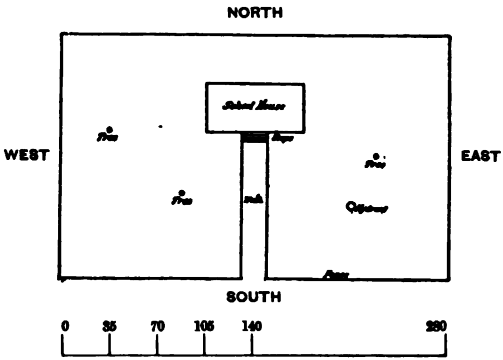
In the next drawing, that of the school yard (Fig. 88), the scale must be much larger, because the yard is so

FIG. 88.
Picture of a school yard. Figure 89 shows a map of this.

much larger than the room. Here one inch represents 140 feet. According to that scale, find out how large the yard and the school building are (Fig. 89). Find how far the trees are from each other, from the nearest fence, and from the building.

Can you not make a map of your own schoolroom? What scale will you use? Put in your own desk, but omit the others, if you wish.

You might also draw a map of your school yard. If you prefer to do so, find its size by stepping or *pacing* it off, making each of your steps about two feet long. Measure the building in the same way. After having finished these two maps, draw a third one, including in it not only the school yard, but also a few of the neighboring streets and houses. The scale for this might perhaps be 1 inch for every 500 steps.



Scale in feet: 1 inch equals 140 feet.

FIG. 89.

A map of the school yard shown in the picture, Fig. 88.

All maps are drawn to a scale in this way, whether they represent a school yard, a state, the United States, or even something still larger. Opposite page 140 you will find a map of North America. On what scale is it drawn? Look at some other maps to find out the scale.

Maps are used a great deal to show the direction of one place from another. But a person must first understand what is meant by north, south, east, and west. Probably you already know that.

One of the easiest ways to find the direction is by a *compass* (Fig. 90). This is simply a piece of steel, called a needle, that swings about easily and always points to the north. It is magnetized, like the horseshoe magnets that you have seen, and it points northward, because something draws it in that direction; but no one knows certainly what this "something" is.

Fig. 90.

A compass. The letter N means north. What do the other letters stand for? Notice that the needle is pointing north and south.

When the stars are shining, one can tell which direction is north by the help of the Great Dipper. The two stars on the edge of the Dipper point toward the North Star. It is so bright that it can be easily picked out, and it is always to the north of us.

One can also find direction by the help of the sun; for, as you know, it rises in the east and sets in the west. Accordingly, when one faces the rising sun, his right side is to the south and his left to the north. Which direction is on his right and left when he faces the west? The south? The north?

Northeast means half way between north and east. Southeast means half way between south and east. What, then, do northwest and southwest mean?

Point north, east, west, south, southwest, northeast, northwest. Walk a few feet in each direction. What direction is your desk from that of your teacher? From the desks of your friends? From the door? What direction is your home from the schoolhouse? From other houses? In what directions do some of the streets extend?

Now let us tell directions on the map. Lay your drawing of the schoolroom upon your desk, so that the line

representing the north side of the room is toward the north. Also place yourself so that you are facing directly north as you look at the map. If your desk faces the wrong way for this, turn round, or put your map upon the floor. Now, north on the map is also north in the room, and the other directions on the map correspond with those in the room. In which direction, on the map, is the door from your desk? From the teacher's desk? Place your map of the school yard in the same position and give the directions.

You see that the north side of this map is the side furthest from you; the east side is on your right, the south next to you, and the west is on your left. When a map is lying before us, we usually look at it from this position.

But it is not always convenient to have a map lying down, especially in the schoolroom, where it must be hung up so that the whole class may see it.

Let us hang up one of these maps and take particular pains to put it upon the north wall. Which direction on the map is north now? It is evident that the north side must be *up*, while east is *on the right*, south is *down*, and west is *on the left*. Certain lines, called lines of longitude, extend due north and south, and others, called lines of latitude, east and west. You should drill yourself to understand directions on maps.

Give the directions of objects from one another while the map is hanging up. Put up the map of the school yard, and any others that you have, and tell the directions from one place to another.[1]

[1] After the children are quite at home in using the map when it is hung on the north wall, hang it on other sides of the room and have them give the directions. This is easy work if properly graded; but the fact that many children studying geography are confused in regard to directions on the map suggests that caution be exercised.

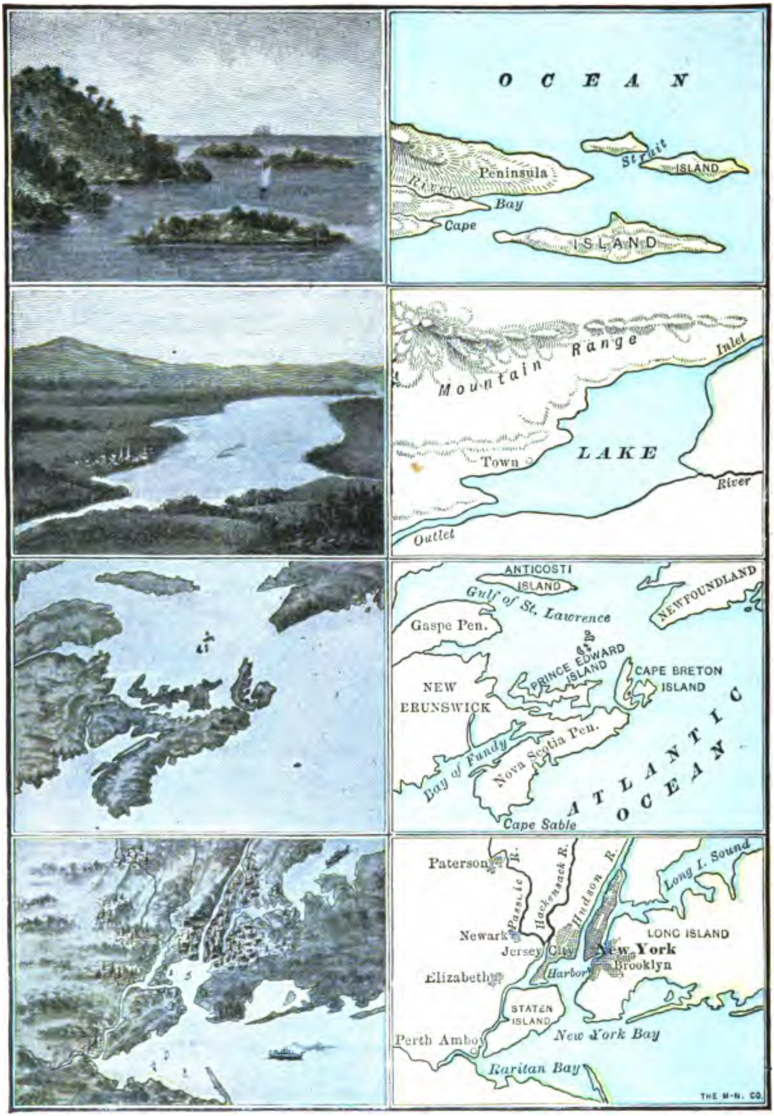


Fig. 91.

To show what maps mean. The left-hand figures show the country as if you were looking down upon it; the right-hand figures represent the same country on maps. Tell what you see in each of these.

It is clear now what a map is. It is a drawing telling something about a country, just as a letter may be some writing telling something concerning a friend. When you read such a letter, you think of your friend, how he looks, what he has been doing, etc. So when you look at a map, you should think about the country, how it looks, how far apart the places are, etc.

There is more than one kind of map. On page 138 there is a picture of North America. It shows how that continent might appear if you looked down upon it from some point far above. A picture like this, showing the mountains and valleys, is called a *relief map*. That is, it gives you some idea of the relief or height of the land.[1]

The maps that you have been drawing do not show this. They are flat maps, representing the country as if it were a flat surface. Opposite page 140 you will find a flat map of North America. Compare it with the relief map on page 138 to see the difference.

In Figure 91 you will see the way in which flat maps are made to represent the land and water. No attempt is made on the flat maps to show just what the country looks like, that is, to represent its relief. They represent the position and direction of towns, rivers, lakes, etc. just as if the country were perfectly flat.

For REFERENCES, see page 110.

[1] If it seems desirable, the teacher may introduce the study of contour maps at this point. The children could draw a contour map of their own neighborhood, and then possibly make a relief map from it by cutting out pieces of pasteboard that correspond to the spaces between the lines. Relief maps may also be constructed by modelling in sand.

REFERENCES TO DESCRIPTIONS, IN PROSE AND POETRY, OF TOPICS TREATED IN HOME GEOGRAPHY. FOR TEACHER AND PUPIL

McM. means The Macmillan Co., New York; Ginn, Ginn & Co., Boston, Mass.; A. B. C., The American Book Co., New York; S. B. C., Silver, Burdett & Co., New York; Heath, D. C. Heath & Co., Boston, Mass.

Section I. The Soil.—King, "The Soil" (McM., $0.75); Tarr, "Elementary Geology," Chapters VI, XI, and pp. 475–487 (McM., $1.40); Shaler, "First Book in Geology," pp. 24–29 (Heath, $0.60). Also other geologies. *Nature Study Quarterly*, No. 2, October, 1899 (Cornell University, College of Agriculture, Ithaca, N.Y. Free on application); Kingsley, "Madam How and Lady Why," Chapter IV, "The Transformation of a Grain of Soil" (McM., $0.50); Wilson, "Nature Study in Elementary Schools. Teacher's Manual," p. 177 (McM., $0.90); Frye, "Brooks and Brook Basins," section on "How Soil is made and carried" (Ginn, $0.58); Strong, "All the Year Round," Part II, sections 7 and 8 (Ginn, $0.30).

Section II. Hills.—Whittier, "Among the Hills" (poem); Whittier, "The Hilltop" (poem); Hutchinson, "The Story of the Hills" (McM., $1.50).

Section III. Mountains.—Lubbock, "The Beauties of Nature," Chapters V and VI (the former on forests) (McM., $1.50); Jordan, "Science Sketches," section on "The Ascent of the Matterhorn" (A. C. McClurg & Co., Chicago, $1.50); Whymper, "Chamonix and Mont Blanc" (Scribner, New York, $1.20); Whymper, "Travels amongst the Great Andes" (Scribner, New York, $2.50); Tarr, "Elementary Geology," Chapter XVII (McM., $1.40); Tarr, "Elementary Physical Geography," Chapter XIX (McM., $1.40); Shaler, "First Book in Geology," Chapter V (Heath, $0.60); Kingsley, "Madam How and Lady Why," Chapter V, "The Ice Plough" (McM., $0.50).

Sections IV and V. Valleys and Rivers. — Tarr, "Elementary Geology," Chapters VI–X; "Elementary Physical Geography," Chapters XV and XVI (each, McM., $1.40); Shaler, "First Book in Geology," Chapter VI (Heath, $0.60); Payne, "Geographical Nature Studies," sections on "Valleys," "Plants of the Valleys," and "Animals of the Valleys" (A. B. C., $0.25); Kingsley, "Madam How and Lady Why," Chapter I, "The Glen" (McM., $0.50); Frye, "Brooks and Brook Basins" (Ginn, $0.58); Lubbock, "The Beauties of Nature," Chapters VII and VIII (McM., $1.50). Poems: "The Brook," Tennyson; "The River," Samuel G. Goodrich; "The Mad River," Longfellow; "The Falls of Lodore," Southey; "The Brook and the Wave," Longfellow; "A Water Song," E. G. W. Rowe; "The Endless Story," A. K. Eggleston; "The Impatient River," E. G. W. Rowe; the last three in Payne, "Geographical Nature Studies" (A. B. C., $0.25).

Section VI. Ponds and Lakes. — Shaler, "First Book in Geology," pp. 125–129 (Heath, $0.60); Tarr, "Elementary Geology," pp. 188–193, and "Elementary Physical Geography," pp. 298–304 (each, McM., $1.40); Lubbock, "The Beauties of Nature," Chapter VIII (McM., $1.50); Payne, "Geographical Nature Studies," section on "Pools, Ponds, and Lakes" (A. B. C., $0.25); "The Lakeside," poem, by Whittier.

Section VII. The Ocean. — Shaler, "Sea and Land" (Scribner, New York, $2.50); Tarr, "First Book of Physical Geography," Part III (McM., $1.10); Lubbock, "The Beauties of Nature," Chapter IX (McM., $1.50); Andrews, "Stories Mother Nature Told Her Children," section on "Sea Life" (Ginn, $0.50); Holland, "The Sea Voyage," in "Arthur Bonnicastle"; Dickens, "David Copperfield," Chapter V; "Robinson Crusoe," Chapter III; Taylor, "The Waves," "Wind and Sea," in Marble's "Nature Pictures by American Poets" (McM., $1.25); Coleridge, "The Ancient Mariner."

Section VIII. The Air. — Tarr, "First Book of Physical Geography," Part II (McM., $1.10); "A Summer Shower," "Cornell Nature Study Bulletin," No. 1, June, 1899 (free on application to Cornell University, Ithaca, N.Y.); Murché, "Science Reader," Book III, sections on "Air," "Vapor in the Air," "Vapor: What becomes of It?" "What the Atmosphere Is," "Ice, Hail, and Snow" (McM., $0.40); Frye, "Brooks and Brook Basins," sections on "Forms of Water" and "The Atmosphere in Motion" (Ginn, $0.58); Strong,

"All the Year Round," Part II, sections 33–39 (Ginn, $0.30); Andrews, "Stories Mother Nature Told Her Children," section on "The Frost Giants" (Ginn, $0.50); Payne, "Geographical Nature Studies," many excellent stories and poems (A. B. C., $0.25); "Nature Pictures by American Poets": "Summer Shower," Dickinson; "Rain," De Land; "Song of the Snowflakes," Cheney; "Cloudland," Cheney (McM., $1.25); Wilson, "Nature Study in Elementary Schools," Second Reader, the following poems: "The Rain Shower," "The Wind Song," "The Bag of Winds," "The Sunbeams," "Snowflakes," "Signs of Rain," "The Rainbow" (McM., $0.35); Lovejoy, "Nature in Verse," the following poems: "Merry Rain," "The Clouds," "The Dew," "The Fog," "The Rain," "The Snow," "The Frost," "Jack Frost," "Little Snowflakes" (S. B. C., $0.60); Shelley, "The Cloud"; Whittier, "The Frost Spirit"; Bryant, "The Hurricane"; Whittier, "Snowbound"; Irving, "The Thunderstorm" (prose).

Section IX. Industry and Commerce. — Payne, "Geographical Nature Studies," sections on "Occupations," "Trade or Commerce," "Transportation by Land," "Transportation by Water" (A. B. C., $0.25); Andrews, "The Stories Mother Nature Told Her Children," section on "The Carrying Trade" (Ginn, $0.50); Whittier, "Songs of Labor."

Section X. The Government. — Brooks, "Century Book for Young Americans" (Century Co., New York, $1.50); Brooks, "The Story of the United States" (The Lothrop Publishing Co., Boston, $1.50); Wilson, "Nature Study in Elementary Schools," Second Reader, section on "Boyhood of Lincoln" (McM., $0.35); Payne, "Geographical Nature Studies," section on "Government" (A. B. C., $0.25).

Section XI. Maps. — Excellent outline maps of states and continents, costing 1½ to 2 cents each, can be purchased from D. C. Heath & Co., Boston, Rand, McNally, & Co., Chicago, and other publishers. Maltby, "Map Modeling" (E. L. Kellogg & Co., New York, $1.00); Kellogg, "Geography by Map Drawing" (same publishers, $0.30); Redway, "The Reproduction of Geographical Forms" ($0.30) and "Teacher's Manual of Geography" ($0.65) (both by Heath); Frye, "The Child and Nature" (Ginn, $0.80); Frye, "Sand and Clay Modeling" (Butler, Sheldon & Co., New York, $0.10); Frye, "Teacher's Manual of Methods in Geography" (Ginn, $0.50); Kellogg, "How to Teach Clay Modeling" (E. L. Kellogg & Co., New York, $0.25); King, "The Picturesque Geographical Readers," First Book, Lesson XIII (Lee & Shepard, Boston, $0.50).

Part II

THE EARTH AS A WHOLE

I. FORM AND SIZE OF THE EARTH[1]

Its Form. — Hundreds of years ago, before America was discovered, men thought the earth was flat. They travelled so little that they had no idea of its form or of its size.

A few men who had studied the matter believed that the earth was a round ball, and that if one travelled straight on in any direction, he would in time return to the place from which he started. You can understand this by pushing your finger around on the outside of an orange, until it comes back to the starting-point.

Christopher Columbus believed this, and went to Spain, hoping to obtain money to secure ships for a long voyage to prove it.

Men were at that time in the habit of going to a land, called India, for spices, silks, and jewels. To reach India from Spain they travelled thousands of miles *eastward;* but Columbus said that if the earth were round, like a ball, India might be reached by going *westward* across the ocean, and the distance would be much less. He therefore asked the king of Spain for ships and men to make such a journey.

The king refused the request, because the idea seemed ridiculous; but the queen came to his aid, and, at last, on August 3, 1492, he

[1] The use of a globe in this study is very important. Small globes may be obtained from dealers in school supplies at a very slight cost.

sailed westward on a voyage from which many thought he would never return; but, after a journey of several weeks, land was reached on October 12th.

Thinking he had reached India, he called the natives Indians; but instead of that he had discovered Cuba and other islands near the coast of North America; a continent and large ocean still lay between him and India. These newly discovered lands became known as the *New World*, to distinguish them from the *Old World*, where all white men then lived.

FIG. 92.

Columbus landing in America and taking possession of it in the name of the King of Spain.

After Columbus returned in safety, other men dared to explore the New World. One of them, named Magellan, started to sail round the earth; and though he was killed when he had reached the Philippine islands, his ships went on and completed the journey. Since then many people have made the voyage in various directions, and the earth has been studied so carefully that every one now knows it is round.

The great round earth is also called the *globe* or *sphere*.

The reason that it does not seem round to us, is that we see so little of it at a time.

If you see very little of an orange, it will not look round either. To prove this, place upon an orange a piece of paper with a small hole in it, so that none of the surface is seen excepting that which shows through the hole. This part does not appear round, but flat.

If we could get far enough away from the earth to see a large part of it at once, as we are when looking at an orange, or at the moon, we would easily be able to observe its roundness (Fig. 93).

FIG. 93.
The sphere.

Size of the Earth. — Our sphere is so large that even the highest mountains, when compared to the whole earth, are no larger than a speck of dust when compared to an apple. Lofty mountains are rarely more than three or four miles high; but the *diameter* of the earth, or the distance from one side to the other, through the *centre of the earth*, is nearly eight thousand miles.

FIG. 94.
Figure of the earth cut in two, to show the diameter, the line passing through the centre (c).

The *circumference* of the earth, or the distance around the outside of it, is about twenty-five thousand miles. This is a little more than three times the diameter, and you will find that the circumference of any sphere is always a little more than three times its diameter. Prove this with an orange.

Review Questions. — (1) What did people formerly know about the shape of the earth? (2) What is its form? (3) Tell the story of Columbus. (4) Why did he call the savages Indians? (5) Why was the land he discovered called the New World? (6) Tell about Magellan's voyage. (7) Explain why the earth does not appear to us to be a sphere. (8) What is the diameter of the earth? The circumference? (9) The latter is how many times the former?

Suggestions. — (1) Read something about the life of Columbus. (2) Read about Magellan. (3) Find the names of some other early explorers and read about them. (4) Trace Columbus's journey on a globe to see where he actually went. Find India in order to see where he thought he had gone, and notice how one can go to India by travelling eastward as well as westward. (5) Make a sphere in clay. Measure its diameter with a needle. (6) How many proofs can you find that the earth is round? Find out how we know that it is like a ball and not like a cylinder. (7) Write a story about Columbus. (8) Trace on a globe the route followed by our soldiers who went to the Philippines; of Admiral Dewey when he returned by way of the Mediterranean. How many days are required for such a journey? (9) Obtain a telescope or an opera glass and look through it at the moon.

For References, see page 257.

II. DAILY MOTION OF THE EARTH, AND ITS RESULTS

The Axis and Poles. — The earth seems to us to be motionless, while *the sun appears to move* round it each day, rising in the east and setting in the west. But in reality neither of these things happens.

Instead of being without motion, the earth is whirling round with tremendous speed. You have perhaps watched a wheel spin about upon a rod or pin, and have noticed that the outside goes rapidly, while the part near the pin moves much more slowly. It is the same with the earth; and just as we speak of the wheel turning upon a pin, so we speak of the earth turning upon its *axis*.

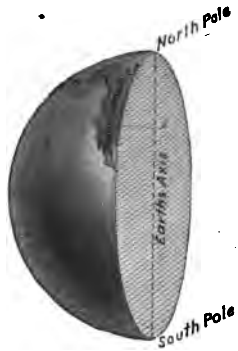


FIG. 95.

A drawing of the earth cut through to show the axis and poles.

But the axis of a wheel is something real, while the axis of the earth is merely *a line that we think of* as reaching through the earth's centre and extending to the surface in both directions.

The two ends of this axis are called the *poles of the earth*, one end being the *north pole*, the other the *south pole*.

Allowing an apple to represent the earth, a knitting needle or a stick pushed through its centre would represent its axis, and the two

ends on the surface, the two poles. You can then spin the apple, very much as the earth spins (Fig. 97).

If you were to go directly north from the place where you live, you would in time come to the north pole; or, if far enough south, to the south pole. Many men have tried to cross the icy seas (Fig. 100) that surround the north pole. If one ever reaches that point, he will not find a pole; but the north star, toward which the axis points, will be almost directly overhead.

The Equator. — Midway between these poles, we think of another line drawn around the earth on the outside. This is called the *equator*, because all parts of it are *equally* distant from each of the poles. On page 113 the distance around the earth was given; what, then, is the length of the equator?

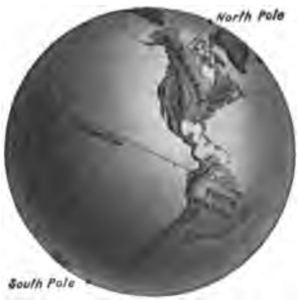


FIG. 96.

A drawing of that half of the sphere containing the New World, — to show the position of the poles and the equator.

As the earth spins on its axis, all points on the surface must go with it, as every part of the skin of an apple turns with it. Since the earth makes one complete turn each day, a man at the equator travels twenty-five thousand miles every twenty-four hours. What a whirling motion that is! It is at the rate of over one thousand miles an hour, while the fastest trains run little more than sixty miles an hour.

Why do not places considerably north or south of the equator move as rapidly as those at the equator?

Gravity. — What, then, is to hinder our flying away from the earth, just as, when a stone is whirled about on a string, it flies away the moment the string breaks? And why is not all the water hurled from the ocean?

The reason is that the earth draws everything toward it. If you push a book from your desk, it falls to the floor; and when you spring into the air, you quickly return to the ground. All objects are drawn *downward*, because the earth is pulling upon them. It attracts them much as a horseshoe magnet attracts pieces of iron.

The force with which the earth draws all objects toward it is called *gravity;* and it is because of gravity that the water, trees, houses, and we ourselves, do not fly off when the earth is turning at such a tremendous speed.

Sunrise and Sunset. — The sun *seems* to rise in the east and set in the west. This could not be the case if the earth did not turn or *rotate* toward the east; for all heavenly bodies must first appear in the direction toward which the earth turns. This eastward rotation of the earth, therefore, explains why the sun seems to rise and set as it does.

Hundreds of years ago people thought that the sun actually rose, and, after moving across the heavens, set in the west. We still use the words "sunrise" and "sunset" which they used, although we know that the sun *appears* to rise only because the earth rotates.

Day and Night. — It is this rotation that causes day and night. A lamp can light only one-half of a ball at a time, as you know. So the sun can light only half of the great earth ball at one time. This being the case, if our globe stood perfectly still, there would always be day on the half next to the sun, and night on the other half.

But since the earth rotates, the place where it is day is constantly changing; and while the sun is setting for people far to the east of us, it is rising for those far to the west. When it is noon where you live, it is midnight on the other side of the earth. Thus each place has its

period of daylight and darkness; and as the earth makes one complete rotation every twenty-four hours, the day and night together must last just that length of time.

FIG. 97.

An apple lighted by a candle on one side, to illustrate the cause of day and night.

REVIEW QUESTIONS. — (1) What motion has the earth? (2) What is the axis of the earth? (3) The north pole? The south pole? (4) Represent the axis and poles by using an apple. (5) Walk toward the north pole. Toward the south pole. (6) What is the equator? (7) How long does it require for the earth to turn completely around once? (8) What rate of travel is that, for a point upon the equator? (9) Why are we not thrown away from the earth? (10) Give several examples showing what is meant by gravity. (11) In what direction is the earth rotating? (12) How does that explain sunrise and sunset? (13) What causes night? (14) What would be the result if the earth did not rotate? (15) When it is noon here, what time is it on the other side of the earth? (16) How long must the day and night together last? Why?

SUGGESTIONS. — (1) Point out the axis of a wheel; of a top; of a rotating ball; of a spinning globe. (2) Mark the two poles on an apple or ball, and then draw a line for the equator. (3) Mould a sphere in clay, and show the poles and the equator. Cut it in half, and mark a line for the axis. (4) Find exactly how many miles a point on the equator moves each hour. (5) Use a horseshoe magnet to attract pieces of iron. (6) Use a globe, or apple, and a lamp to show why the sun appears to rise and set, and why it is day on one side while it is night on the other. (7) Watch the stars in the east some night, to see which way they appear to move. (8) Why do not the clouds appear to move westward also? (9) Is the sun always shining during the day? Why, then, do we not always see it? (10) Who was Atlas? Who was Aurora? (11) Find out what the ancients supposed became of the sun each night. (12) When it is noon here, what time is it one-fourth of the distance around the earth to the east? To the west?

FOR REFERENCES, see page 258.

III. THE ZONES

Boundaries of the Zones. — The sun's rays feel warmer at noon than in the early evening because the sun is more nearly overhead at noon, and the rays then reach us nearly vertically.

Fig. 98.

A map of the zones. The colors suggest *sharp* differences between the zones on the two sides of the boundaries; but you should remember that the changes are *very gradual*.

For the same reason the sun seems hotter in summer than in winter, and in some parts of the earth than in others.

The hottest part of the earth is near the equator, for in that region the sun at midday is directly over the heads of the people. That is the case, for a part of the year, as far north as the line on the map (Fig. 98) marked *tropic of Cancer*, and as far south as the one marked *tropic of Capricorn*. Point to them on Figures 119 and 120. These lines are more than three thousand miles apart, a distance greater than that across the United States from Boston to San Francisco; and over that vast area the heat is intense, or *torrid*. Those who live there wear only the very lightest clothing, and the savages have almost none (Fig. 99).

But further north and south the heat becomes less and

less intense, because the rays of the sun, even at noon, approach the earth at a greater slant. There is a region, then, on each side of this broad hot belt, where it is neither very hot nor very cold, but *temperate.*

Finally, near the poles, the rays are very slanting, as they are in our early morning or late afternoon. There it is so cold, or *frigid,* that the ground never thaws out, the ice never entirely disappears, and very little vegetation can grow.

Torrid Zone. — Thus one part of the earth has a hot climate. There the noonday sun is always so directly over the heads of the inhabitants that they never have winter.

FIG. 99.

Philippine savages hunting; their home is in the torrid zone, and they need almost no clothing.

This hot region extends entirely around the earth, like a great belt, and the equator is in the middle of it. This is called the *tropical belt,* or the *tropical* or *torrid zone,* and sometimes the *equatorial belt.* Why the latter name?

Temperate Zones. — On the north and south sides of this are the two temperate zones. People living in the *north temperate zone* find the sun to the south of them at noon, even in summer; and their shadows always

fall toward the north. But in the *south temperate zone* the midday sun is always in the north. Which way must the shadows fall in that zone?

Notice the position of the sun at midday where you live, and also the direction and length of your shadow at that time. In which of the temperate zones do you live?

Fig. 100.

Cape York Eskimos, Greenland, in their summer dress, standing by their sleds on the ice-covered sea.

Frigid Zones. — North of the north temperate zone, and south of the south temperate, are the *frigid zones*, where the sun is never high in the heavens, but even at midday is near the *horizon*. There the shadows are very long, as they are with us in the late afternoon. In consequence, while at the equator there is never any winter, near the poles there is never any real summer weather.

The northern of these zones is called the *north frigid*

zone (Fig. 100); the southern, the *south frigid zone.* They are also known as the *polar zones*, since they surround the poles.

It is so cold that no one has ever been able to reach either of the poles. These are surrounded by miles and miles of snow and ice, and vessels hundreds of miles away from them are in danger of being crushed by ice, or held by it so that they cannot move.

Hemispheres. — The half of our sphere north of the equator is called the *northern hemisphere* (or half sphere), the southern half, the *southern hemisphere.* The earth is also divided into halves by a circle running north and south through both poles, the western half, containing the New World, being called the *western hemisphere*, and the eastern half, containing the Old World, the *eastern hemisphere.*

Review Questions. — (1) What is the cause for the great heat in the torrid zone? (2) What are its boundaries? (3) What other zones are there? What are their boundaries? (4) In which direction does the midday sun lie in each zone? (5) In which direction do the shadows then fall? (6) Why should the heat grow less, the farther one travels from the equator? (7) Why has no one ever been able to reach either pole? (8) Which part of the earth has no cold weather? (9) Which part has no hot weather? (10) Point out the zones in Figure 98. (11) Represent them in a drawing of your own. (12) Name the hemispheres and tell where each is.

Suggestions. — (1) Find out more about the reason why the sun's rays are hotter when the sun is overhead than when it is low in the heavens. (2) Write a story telling about the changes in clothing you would need to make in passing from the north to the south pole. (3) In which direction would you look to see the sun at noon on such a journey? (4) How might the changes in heat affect the growth of trees and other plants? (5) How would the direction of your shadow change? Its length? (6) If there were no watches or clocks, how could you tell the time of day from the sun? (7) Find out about some of the men who have tried to reach the north pole. (8) In which zone should you prefer to live? Why? (9) Explain how some places in the temperate zone are warmer than some in the torrid zone. For references, see p. 258.

IV. HEAT WITHIN THE EARTH, AND ITS EFFECTS

Heat in Mines. — While much is known about the surface of the earth, very little is certain about its interior. The reason for this is that people cannot go far down below the surface in order to see what is there.

FIG. 101.

Melted rock, from a volcano in the Hawaiian Islands, flowing over the face of a precipice into the water.

In some places there are mines reaching fully a mile below the surface. This may seem a great depth; but when it is remembered that it would be necessary to go four thousand times as far to reach the center, it is plain that this is really a short distance. A mile below the surface of the earth is not so much as the thickness of the skin of an apple, compared with the thickness of the apple itself.

In all of these mines, and in many deep wells, men find solid rock, usually covered at the surface with soil; but no one has ever gone beyond this rock.

It is interesting to note that the farther miners have dug down into the earth, the warmer they have found it. The thermometer rises about one degree for every fifty or sixty feet, and some mines, as they have been deepened, have become so hot that men could no longer work in them.

Melted Rock. — This has led to the belief that, if it were possible to go still deeper, the earth would be found to grow hotter and hotter, until, several miles below the surface, it might be hot enough to melt rocks.

Another fact leading to the same belief is that, in some regions, melted rock, called *lava*, actually flows out of the earth, and then cools to form solid rock (Fig. 101). In some places so much lava has flowed forth at different times, and collected about the opening called the *crater*, that a mountain peak has been built. Such peaks are called *volcanoes* (Fig. 102), and some of them are many thousand feet high.

FIG. 102.
Vesuvius, in Italy, sending out lava, ashes, and steam during an eruption some years ago.

The Earth's Crust. — From a study of the earth it seems certain that, although the outside is now cold, it was once hot, and that the mass within is still hot. It may be compared to a biscuit that is still hot inside, although its crust has become cool. In fact, this cold outside part of the earth is generally called the *earth's crust*.

Cause of Mountains. — It was stated on page 19 that some parts of the earth have been raised to form mountain

ranges, while others have been lowered to form valleys. We are now ready to explain how this has happened.

You have, perhaps, seen a blacksmith put a tire upon a wheel. He heats the tire so hot that it expands, and it is then easily placed over the wheel. But when the iron cools it shrinks, so that the tire then fits the wheel tightly.

FIG. 103.
An apple wrinkled through drying.

The hot interior of the earth is undergoing a similar change, since every year it is slowly growing cooler, and, therefore, shrinking or *contracting*. This allows the cool crust to settle; but, being too large, it wrinkles, or puckers, causing the rocks to bend and break, and forming great mountain ranges and valleys.

One sees something of the same kind in an apple that has become dry and wrinkled (Fig. 103). It has dried because some of the water beneath the tough skin has gone into the air as vapor; thus the inside has been made smaller. The skin of the apple, like the crust of the earth, has then settled down and become wrinkled.

Cause of Continents and Ocean Basins. — The mountains and valleys are not the largest wrinkles on the earth's surface. As the crust has settled, some portions have been lowered several miles further than others, and in these great depressions the waters have collected, forming the *oceans*, which in places are four or five miles deep.

Those great portions of earth's crust which rise above the ocean are called *continents*; and the highest mountain peak upon them is fully eleven miles above the deepest part of the ocean.

Change in the Level of the Land. — The contracting of the earth has caused many changes, and is still causing them. Some parts of

the land have risen out of the ocean, and other parts have sunk beneath it. Perhaps the place where you live, even though it be among the mountains, was once below the ocean. This can be proved, in some places, by finding certain shells, called *fossils*, in the rocks.

FIG. 104.

A rock containing many fossil shells.

Ages ago these shells were parts of animals living in the ocean; but on the death of their owners they became buried in the mud and lay there for centuries until the layers of mud became slowly hardened into rock. This was later lifted above the water, and then frost, rain, and rivers wore the upper layers away, bringing the fossils to light.

We have already seen (page 2) how rock is changing to soil and being washed from the land into the ocean. We now learn that this settles upon the ocean bottom, hardens into rock, and then, perhaps, is lifted into the air. These changes are very slow, but they are going on all the time. Places once inhabited by men are now beneath the sea, and others where they now live have risen above it.

REVIEW QUESTIONS. — (1) What is known about the temperature of the earth below the surface? (2) What does that suggest? (3) What other proof of this conclusion is there? (4) What is a volcano? (5) What is the crust of the earth? (6) What happens as the interior cools? (7) Compare this with the drying of an apple. (8) How have the ocean basins and continents been formed? (9) What do fossils in the rocks prove?

SUGGESTIONS. — (1) Collect pictures of volcanoes. Of earthquakes. Read about some volcanic eruption. (2) Make a drawing of a volcano. (3) Dry an apple and notice the change. (4) Not all rocks contain fossils; but examine those in your section to find if they do. (5) If you live near a beach, notice how shells are covered by the sands. (6) If a mine were a mile deep, what would be the temperature at the bottom, if the average temperature at the surface is 45°.

FOR REFERENCES, see page 258.

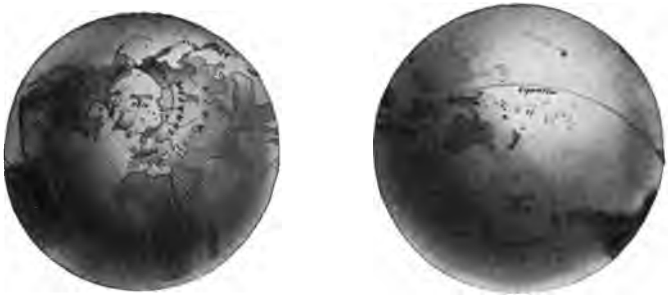


FIG. 105. — Land (on left-hand side) and water (on right-hand side) hemispheres. *Hemisphere* means half sphere; that is, half the earth.

V. THE CONTINENTS AND OCEANS

Land and Water. — The greater part of the land is found in the northern hemisphere, the greater part of the water in the southern (Figs. 106 and 112).

FIG. 106. — The northern hemisphere, showing the land about the north pole, Eurasia in the eastern hemisphere, and America in the western.

It is possible to divide the earth into halves, in one of which — the *land hemisphere* — nearly all the land is situated, while in the other — the *water hemisphere* — there is very little land. This is shown in Fig. 105.

The Continents

In Figure 106, or, better, on a globe, notice that two great masses of land extend from the north polar zone. One of these lies in the western hemisphere, and is the land on which we live; the other is in the eastern hemisphere.

North America. — The western land, which is better shown in Fig. 107, is broad near the north pole, and tapers down nearly to a point just north of the equator, having the form of a triangle. What is the name of this part?

Show where New York, Washington, and Chicago should be on this map. (See the map, Fig. 120.) Point also to your home. Find some rivers, mountains, peninsulas, gulfs, and other forms of land and water.

Fig. 107.

The half of the sphere containing the New World.

South America. — South of North America, and connected with it by a long neck of land, the Isthmus of Panama, lies the continent of *South America*. The two continents together are called the two Americas, forming the New World which Columbus discovered (p. 111). Notice how much alike they are in shape; draw triangles to show this.

Through what zones does North America extend? (See Fig. 98, p. 120.) South America? Point to the places where there is snow all the time; to the part where there is never any snow. Where must the Eskimo girl, Agoonack, one of the Seven Little Sisters, have lived? Read about the Eskimos on p. 192.

Tell how the climate would change if you were to travel from the northern end of North America to the southern end of South America. What changes would you expect to find in the plants? In the clothing of people? Write a story about such a journey.

On the opposite page are pictures of some of the wild animals of South America (Fig. 109). What wild animals live in North America? Collect pictures of them. Have you ever seen any of them?

Eurasia. — East of us, across the Atlantic Ocean, is the Old World (Figs. 108 and 113). More land is found

NORTH

SOUTH

Fig. 108. — A hemisphere showing a part of Eurasia and Africa.

Fig. 109.

Some of the animals of South America.

there than in the New World, and the largest mass of it is called *Eurasia.*

The northern part of Eurasia is in the North Frigid zone, on the opposite side of the north pole from North America (Fig. 106), and extends a great distance east and west. Find for yourself how far south it reaches, and through what zones it passes.

Long ago, before Columbus made his voyage to the New World, the most civilized people lived in *Europe*, the western part of that great continent.

The homes of Jeannette and Louise, two of the Seven Little Sisters, were in that country. If you have read the story, can you not tell something about each of them?

Fig. 110.
The home of Jeannette among the Swiss mountains. Find other pictures of these mountains on pages 18 and 23.

The eastern part of the continent is called *Asia.*

Read in the "Seven Little Sisters" about Gemila, the child of the desert, and of Pen-se, the Chinese girl, whose homes were in Asia.

Europe is usually considered one continent and Asia another, although, as you can see from the maps, especially Fig. 106, they are not

so clearly separated as the other continents are. For this reason Europe and Asia are often called one continent, Eurasia, the name being made up of "Eur," from Europe, and "Asia."

Point toward this continent. Walk toward it. Which is probably its warmest part?

Africa. — South of Europe is the continent of Africa.

Here lived the little dark girl, Manenko, one of the Seven Sisters, and this is the place the negroes came from.

FIG. 111.

The tiger, one of the wild animals of Africa and Asia.

In what zones does Africa lie? How does it compare with South America in temperature? In shape? In what direction would you start in order to go directly to Africa?

Australia. — South of Asia are many large islands called the East India Islands (Fig. 120). Find the zone in which they lie. Southeast of these is a large island known as the continent of *Australia* (Fig. 119). In what zones is it?

The Oceans

The Arctic and Antarctic. — There seems to be a great deal of land; but, as we have learned (p. 63), three-fourths of the earth is covered by ocean water. The water around the north pole (Fig. 106) is called the *Arctic Ocean*. Find it on a globe.

There are many islands in this ocean, and the water between them is covered with ice. The climate is so cold that there are very few people, and no crops of any kind can be raised. Here the Eskimos live, hunting the polar bear, seal, and walrus to obtain meat for food, fur for clothing, and oil for fuel and light (see p. 192).

Much less is known about the *Antarctic Ocean* (Fig. 112), which surrounds the south pole, and in which there is also a great deal of floating ice.

The Atlantic. — Extending from the Arctic to the Antarctic is the *Atlantic Ocean*, having the Old World on the east and the New World on the west. This is the water that we cross in going to Europe, and many of the things we eat and wear are brought across it. Can you name some of them? Find what continents the Atlantic bathes?

The Pacific. — The water west of North America is called the *Pacific Ocean*, which is the largest of all oceans, occupying more than one-third of the earth's surface. What continents does it bathe? Walk toward it.

The Indian. — There is still another great body of water called the *Indian Ocean* (Fig. 108). It lies south of India in Asia, and between Africa on one side and Australia and the East Indies on the other.

The Ocean Bottom. — The depth of the ocean water varies considerably; on the average it is a little over two

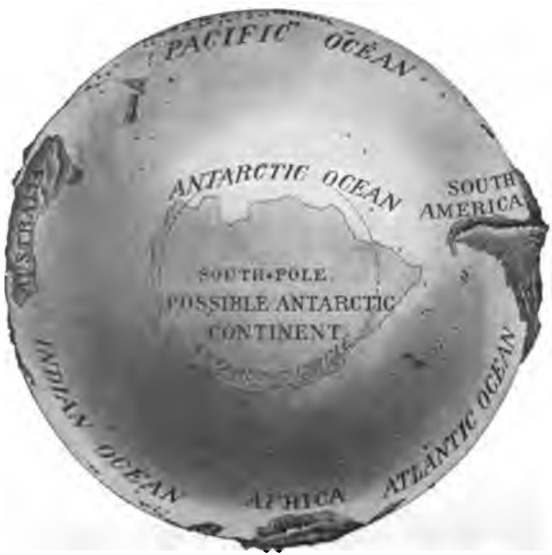


Fig. 112.

The southern hemisphere, showing the water surrounding the south pole. Notice that the Antarctic is not separated by land from the other oceans.

Fig. 113.

The Atlantic Ocean.

NORTH POLE

SOUTH POLE

FIG. 114.

The eastern part of the Pacific Ocean.

NORTH POLE

SOUTH POLE

FIG. 115.

A part of the globe. What continents and oceans are shown?

miles, but in some places it is more than four miles deep. In this immense body of water are millions of animals, some of them, as the whale, shark, codfish, and seal, being of use to man.

The bed of the ocean is mainly a great plain, where it is as dark as our darkest night, because the sunlight cannot pass through so much water. In consequence, the fish living there have little use for eyes, and some have none.

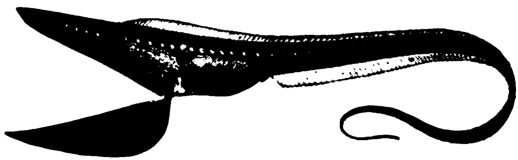


FIG. 116.
One of the deep-sea fish.

The mud which covers the bottom is in many places made up of the shells of tiny animals, many of them even smaller than a pinhead. Some of the chalk used in schools was just such mud before it was raised to form rock layers on the dry land.

Mountains in the Oceans. — While most of the bottom of the sea is a plain, some parts are not so level. Here and there are mountain peaks, and chains of islands, extending above the sea far away from the continents. Many of these are portions of mountain chains rising above the water; but many, like the Hawaiian Islands, are volcanoes which have been built up by lava flowing from the interior of the earth (p. 125).

FIG. 117.
A piece of coral, with the polyps projecting from the hard coral like a bunch of flowers.

Coral Islands. — In the open ocean there is another interesting kind of island known as the ***coral island*** (Fig. 118). Some very tiny creatures, called ***coral polyps***, build hard, limy coral, such as you have no doubt seen. Where the ocean water is warm, as in the torrid zone, these little animals live in immense numbers, millions of them around a single island.

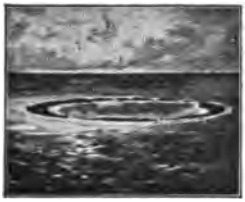


FIG. 118.

A ring-like coral island, called an *atoll*, in the open ocean.

Each polyp resembles a fully blossomed flower; and they vary greatly in color, being white, pink, purple, red, yellow, brown, and many other colors. It is a truly beautiful sight to see them spread out in the water, looking like a flower garden in the sea (Fig. 117).

When these coral animals die, the hard coral part remains. Then other polyps build upon these skeletons, and this is continued until the surface of the water is reached and coral islands are formed.

REVIEW QUESTIONS. — (1) Name the five continents, counting Eurasia as one. (2) Write their names. (3) Walk toward each of them. (4) Tell what you can about each. (5) Where is the Arctic Ocean? The Antarctic? (6) Tell something about the people and animals of the Arctic region. (7) What oceans touch North America? (8) Name five oceans. Which is the largest? (9) What are the conditions on the ocean bottom? (10) In what ways are islands in the open ocean formed? (11) How are coral islands made.

SUGGESTIONS. — (1) Make an outline drawing of each of the continents. (2) Of each ocean. (3) Collect pictures of the animals, people, and scenery of the continents. (4) Write a story about one of the pictures. (5) Obtain pieces of coral for the school collection.

FOR REFERENCES, see page 258.


North Pole
ARCTIC OCEAN
Greenland
NORTH AMERICA
ATLANTIC OCEAN
TROPIC OF CANCER
EQUATOR
PACIFIC OCEAN
SOUTH AMERICA
TROPIC OF CAPRICORN
ANTARCTIC CIRCLE
ANTARCTIC OCEAN
South Pole
160°
180°
160°
140°
120°
100°
80°
60°
40°
20°
0°
20°
40°
60°
80°

Fig. 1


North Pole
ARCTIC OCEAN
ARCTIC CIRCLE
EUROPE
ASIA
PACIFIC OCEAN
TROPIC OF CANCER
AFRICA
EQUATOR
INDIAN OCEAN
ATLANTIC OCEAN
TROPIC OF CAPRICORN
AUSTRALIA
ANTARCTIC CIRCLE
ANTARCTIC OCEAN
South Pole

FIG. 119.

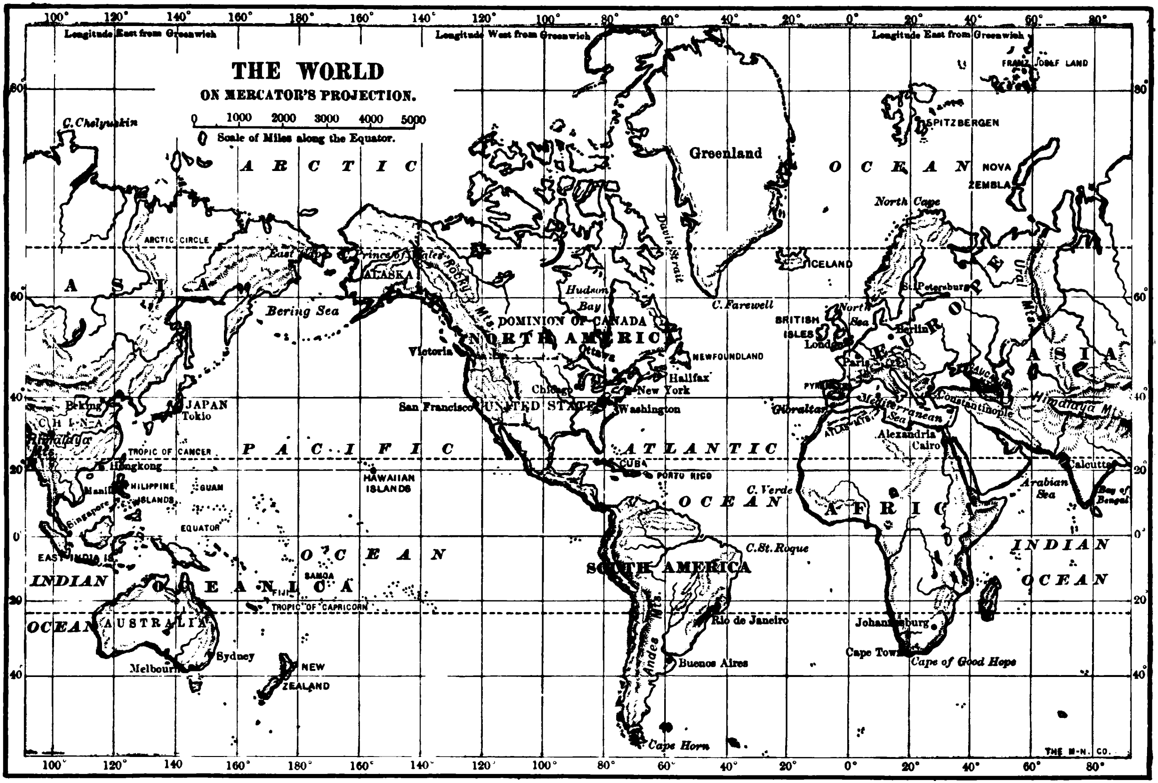

THE WORLD
ON MERCATOR'S PROJECTION.
0 1000 2000 3000 4000 5000
Scale of Miles along the Equator.
Longitude East from Greenwich
Longitude West from Greenwich
Longitude East from Greenwich
ARCTIC OCEAN
PACIFIC OCEAN
ATLANTIC OCEAN
INDIAN OCEAN
INDIAN OCEAN
OCEANICA
ASIA
EUROPE
AFRICA
NORTH AMERICA
SOUTH AMERICA
AUSTRALIA
ARCTIC CIRCLE
TROPIC OF CANCER
EQUATOR
TROPIC OF CAPRICORN
Greenland
ICELAND
SPITZBERGEN
NOVA ZEMBLA
North Cape
Davis Strait
C. Farewell
BRITISH ISLES
London
North Sea
Berlin
St. Petersburg
Paris
Gibraltar
Mediterranean Sea
Constantinople
Alexandria
Cairo
Ural Mts.
Himalaya Mts.
Calcutta
Arabian Sea
Bay of Bengal
Johannesburg
Cape Town
Cape of Good Hope
C. Verde
C. St. Roque
Rio de Janeiro
Buenos Aires
Andes Mts.
Cape Horn
CUBA
PORTO RICO
NEWFOUNDLAND
Halifax
New York
Washington
Chicago
Ottawa
DOMINION OF CANADA
UNITED STATES
Hudson Bay
ROCKY Mts.
Victoria
San Francisco
ALASKA
Bering Sea
East Cape
C. Chelyuskin
JAPAN
Tokio
Peking
CHINA
Hongkong
Manila
PHILIPPINE ISLANDS
GUAM
HAWAIIAN ISLANDS
Singapore
EAST INDIA IS.
SAMOA
FIJI
Sydney
Melbourne
NEW ZEALAND
THE M-N. CO.

FIG. 120.

VI. MAPS

THE maps that have been thus far used are all hemispheres, and represent the earth as it would appear if we looked down upon it from above. Such maps are especially desirable because they call attention to the roundness of the earth; but they are so difficult to make that it is customary to represent the earth on flat maps instead.

In Figure 119 you can see the difference between the two. While the lower ones show the roundness of the earth, the upper two represent it as quite flat. Although they are unlike, the latter show the position of the land and the water quite as plainly as the former. Since this is true, and since it is much easier to make the flat maps, these will be the ones chiefly used hereafter in this book. But in studying flat maps one should always remember to think of the earth as round, and not as a flat surface.[1] Examine Figure 120 also.[2]

[1] The teacher should see that this is done by frequent use of a globe. It is advisable to have one large globe and several small ones, so that each pupil may have one for frequent use.

[2] These maps (Figs. 119 and 120) should be carefully studied, the pupil following map questions given by the teacher to cover form, location, etc., of continents, oceans, and important places.

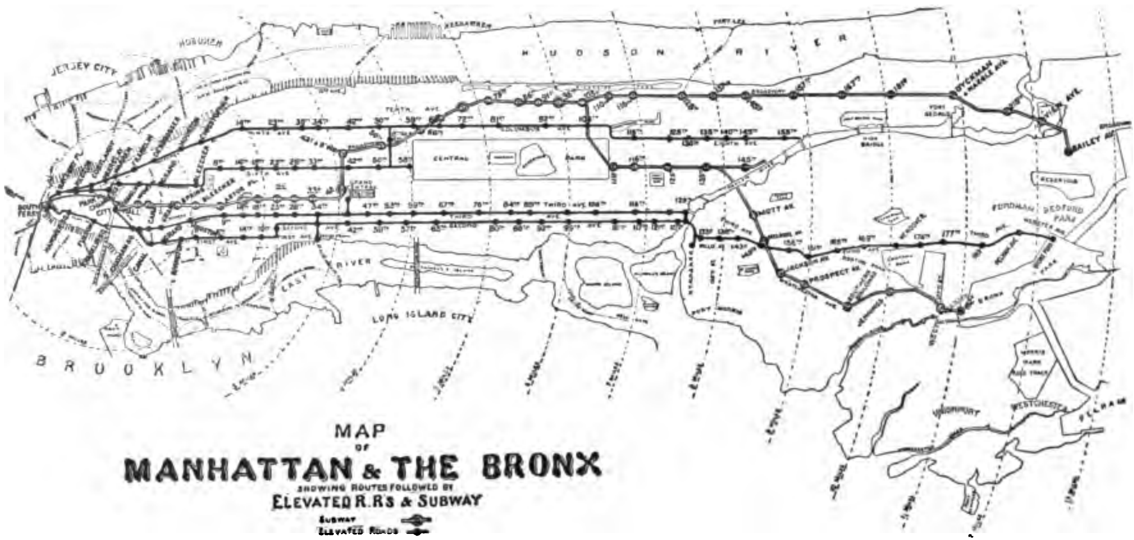
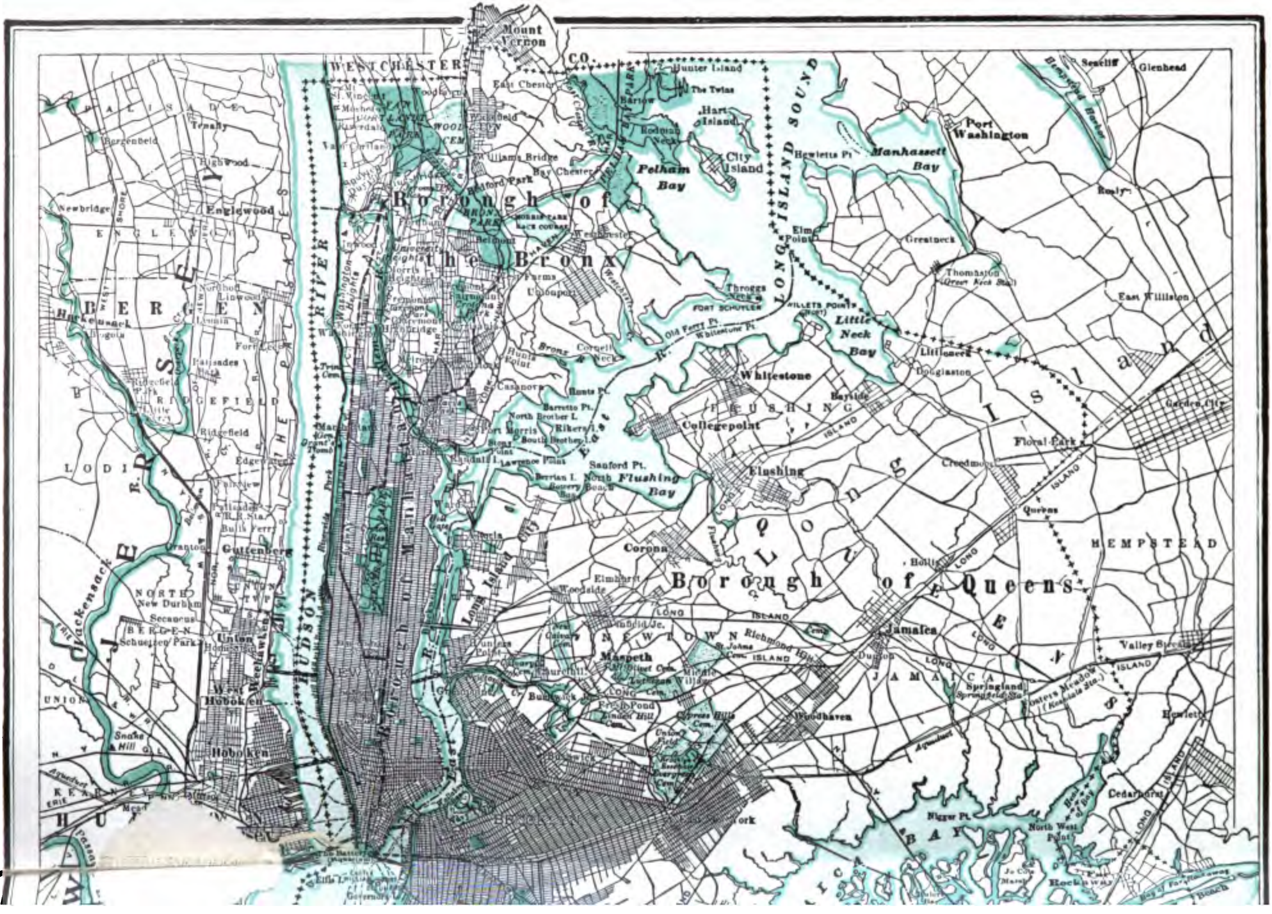
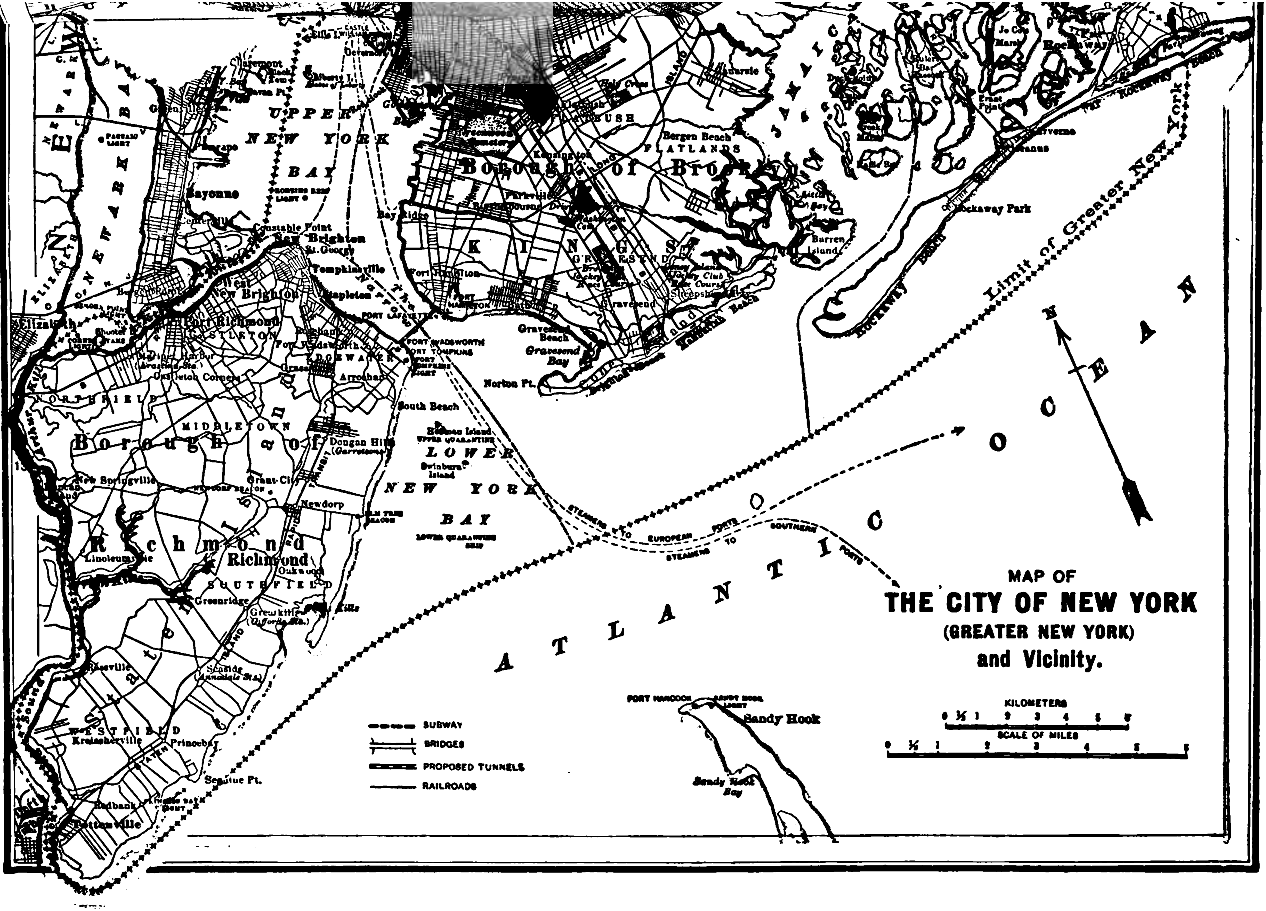

MAP
OF
MANHATTAN & THE BRONX
SHOWING ROUTES FOLLOWED BY
ELEVATED R.R'S & SUBWAY
SUBWAY
ELEVATED ROADS
HUDSON RIVER
JERSEY CITY
HOBOKEN
WEEHAWKEN
FORT LEE
BROOKLYN
LONG ISLAND CITY
EAST RIVER
CENTRAL PARK
TENTH AVE
COLUMBUS AVE
EIGHTH AVE
SIXTH AVE
THIRD AVE
SECOND AVE
MOTT AV.
JACKSON AV.
PROSPECT AV.
FORDHAM
BEDFORD PARK
WESTCHESTER
PELHAM
BAILEY AV.
DYCKMAN
RESERVOIR

FIG. 121.



Mount Vernon
WESTCHESTER CO.
Borough of the Bronx
Borough of Queens
Borough of Manhattan
LONG ISLAND SOUND
Long Island
HUDSON RIVER
BERGEN
Hunter Island
The Twins
Hart Island
City Island
Pelham Bay
Manhasset Bay
Port Washington
Sea Cliff
Glenhead
Hempstead Harbor
Roslyn
Greatneck
Thomaston
East Williston
Little Neck Bay
Littleneck
Douglaston
Bayside
Whitestone
Collegepoint
Flushing
Flushing Bay
Floral Park
Garden City
Creedmoor
Queens
HEMPSTEAD
Hollis
Jamaica
Valley Stream
Springfield
Hewletts
Cedarhurst
Woodhaven
Corona
Elmhurst
Woodside
Maspeth
NEWTOWN
Richmond Hill
JAMAICA BAY
Englewood
Tenafly
Bergenfield
Newbridge
Hackensack
Ridgefield
Guttenberg
West Hoboken
Hoboken
Weehawken
NORTH BERGEN
New Durham
Secaucus
Schuetzen Park
Union
Snake Hill
LODI
UNION
KEARNEY
East Chester
Westchester
Bay Chester
Williams Bridge
Bedford Park
Belmont
Unionport
Throggs Neck
Fort Schuyler
Willets Point
Casanova
Hunts Pt.
Barretto Pt.
North Brother I.
Rikers I.
South Brother I.
Lawrence Point
Sanford Pt.
North Beach
Long Island City
Ravenswood
Astoria
Elm Point
Hewletts Pt.
Nigger Pt.
North West Point
Rockaway


MAP OF
THE CITY OF NEW YORK
(GREATER NEW YORK)
and Vicinity.
KILOMETERS
SCALE OF MILES
SUBWAY
BRIDGES
PROPOSED TUNNELS
RAILROADS
ATLANTIC OCEAN
Limit of Greater New York
UPPER NEW YORK BAY
LOWER NEW YORK BAY
Borough of Brooklyn
Borough of Richmond
KINGS
NEWARK BAY
JAMAICA BAY
Sandy Hook
Sandy Hook Bay
Bayonne
New Brighton
St. George
Tompkinsville
Stapleton
West New Brighton
Port Richmond
CASTLETON
NORTHFIELD
MIDDLETOWN
SOUTHFIELD
WESTFIELD
New Springville
Dongan Hills
Grant City
Newdorp
Richmond
Greenridge
Princebay
Tottenville
Kreischerville
South Beach
Fort Wadsworth
Arrochar
Bay Ridge
Fort Hamilton
Gravesend
Gravesend Bay
Gravesend Beach
Norton Pt.
Parkville
Kensington
FLATBUSH
FLATLANDS
Bergen Beach
Canarsie
Barren Island
Rockaway Park
ROCKAWAY BEACH
Constable Point
Swinburne Island
Hoffman Island
Elizabeth
STEAMERS TO EUROPEAN PORTS
STEAMERS TO SOUTHERN PORTS
FORT HANCOCK
N
E

Part III

THE CITY OF NEW YORK

I. TOPOGRAPHY

How many girls and boys playing in the smooth, well-paved streets of New York, within sight of great, tall buildings of brick and stone, ever think of a time when these things were entirely unknown? And yet, if we had a magic glass through which we might look at the site of our city as it appeared three centuries ago, what a strange sight would greet our eyes! A beautiful island covered with thick forests. How green and dark and still it all seems! Even the waters are quiet and undisturbed until suddenly a light birch canoe darts out from the shore. "Indians?" we say, "real red Indians living on our island and paddling on our rivers?" Yes, Indians who have never seen a white man.

No one now living remembers the time when Indians dwelt here in villages, hunting wild animals for food, clothing, and shelter. But there are those still living who remember well that a large part of our city was once a dense wood. They recall too a time when much of the land on which the city stands did not look so flat as it does now.

Look at the map and you will see how irregular the city of New York appears. It looks as if it had been cut

NOTE. — Part III was prepared by a teacher in the New York City schools.

into several pieces and each piece separated by water from its fellows. First, there is a long, narrow body of land set between two rivers. This is the borough of *Manhattan*. • North of this is a square-shaped piece called the borough of *The Bronx*. The river west of Manhattan and The Bronx is the Hudson, which, in this part of its course, is usually called the North River. It separates these two boroughs from New Jersey. To the east and south, separated from Manhattan by the East River and the Upper Bay, are the boroughs of *Brooklyn* and *Queens*. They are part of a large island (Long Island) stretching to the east. Still another island (Staten Island) forming part of the city lies southwest of Manhattan. This is the borough of *Richmond*.

FIG. 123.

A relief map of New York harbor and vicinity. (Modelled by E. E. Howell, Washington, D.C.)

The North and East rivers meet at the southern end

of Manhattan Island, flowing into the wonderful harbor we know as Upper New York Bay. Staten Island protects the bay from storms of ocean on the south, and the borough of Brooklyn shuts it in on the east.

Opposite New York are Jersey City, Hoboken, and Weehawken. The arms of the bay allow vessels to ascend the Passaic River through Newark Bay to Newark.

So vast are the changes which have taken place since Hudson in his little vessel entered New York Bay, he would hardly know the scene if he were to revisit it to-day. Hills from which Indians gazed in frightened wonder at his ships have disappeared, valleys where they hunted for game are filled, streams from which they fished are gone. In the parts of the city which have not been divided into lots and marked by streets, we may still see the land in much the same condition as the old Dutch farmers and traders knew it.

In parts of Manhattan, especially above Thirtieth Street, the avenues and streets still follow the natural slope of the land. On the west, the surface of the island rises from the lower end of Riverside Park to the northern end of the island. In this section, going toward the north, are Washington Heights, Fort George (One Hundred and Ninety-sixth Street), Inwood (Two Hundred and Seventh Street), and the Kingsbridge Hills.

Where the land could be easily graded, the surface of Manhattan has undergone such changes as in time will follow more and more in the other boroughs. Much of Battery Park is "made" ground, that is, it consists of earth dumped into the marshes along the shore in order to increase the amount of land. In the neighborhood of Ferry, Pearl, Water, and Front streets there was formerly a marsh, and the name Canal Street reminds us of the canal which once served as an outlet for the ponds and marshes in the interior of the island.

In Richmond there is a ridge, in some places nearly four hundred feet high, extending along the island from

northeast to southwest. In those parts of Brooklyn and Queens not yet levelled and graded the land lies in great rolling ridges, as it did in olden times. In The Bronx, the bluffs which the Bronx River divides unequally into an eastern and a western part, are in many places showing the changes caused by the use of the spade, pickaxe, and drill. These bluffs reach their highest points at Fordham and Van Cortlandt Park.

MAP QUESTIONS. — (1) Which is the largest borough? The smallest? (2) What county borders on The Bronx? (3) On what island are Brooklyn and Queens? (4) What boroughs border on New York Bay? On the East River? (5) Compare The Bronx with Richmond in area. (6) Name the boroughs in order of size. (7) What boroughs border on the ocean?

II. THE LAND AND WATER FORMS

YOU have all heard about the splendid harbor of New York. What is meant by a harbor? What makes a harbor safe ? (Page 57.) What bodies of land shut in the harbor of New York?

Name three bays on the north shore of Queens. Where is Newark Bay? Jamaica Bay? What is the name of the strait through which ocean steamers must pass to reach New York harbor? Some straits connect two bays or other larger bodies of water. Can you find such a strait near New York? Why is the East River really a strait? Why may not the Hudson be called a strait? Find all the straits that connect New York harbor with other bodies of water. Can you see any advantage in having so many entrances to one harbor?

What strait separates Richmond from New Jersey? (*Kill* was the word for strait used by the Dutch settlers of Manhattan.) Where is the Kill von Kull? What separates Long Island from the mainland?

You have all been to Coney Island or to Rockaway Beach. Many of you have been in bathing there. What happens to the rolling waves when they reach the shore? This explains why we call them *breakers*. You have heard people speak of *surf-bathing*. They mean bathing in the ocean where there are breakers. Much of the land along the southern shore of Brooklyn and Queens is low and sandy. In some places there are long, narrow strips of sandy beaches partly or entirely separated from the mainland. These are called sand reefs. The water behind a sand reef is quiet and shallow. It forms a kind of bay, but here it is called a lagoon. Coney Island and Rockaway are both sand reefs.

In the East River are Rikers, Wards, and Blackwells islands. These are all used by the city for public buildings, such as houses for the shelter of poor people too old or too ill to work, and others for the punishment of those who have done wrong. In the Upper Bay are Ellis

Fig. 124.

The lake in Central Park.

Island, where immigrants are received, and Bedloes Island, on which stands the statue of Liberty. Near the Battery is Governors Island, the property of the United States Government, used as a post for officers and soldiers of the United States army. In the Lower Bay is Swin-

burn Island, on which stands a hospital for people suffering from disease, taken from incoming steamers. Here too is Hoffman Island, where those who have been exposed to contagious diseases are detained until all danger of others taking such diseases from them is past.

Which of the boroughs are islands? Name the waters surrounding each borough. Find other islands in the Sound. Find two tiny islands in Staten Island Sound.

Some of the large parks have pretty lakes in them. If you will visit one of these lakes you will see, on a very small scale, islands, bays, and straits. Here is a map of the lake at Seventy-second Street in Central Park. Point out a bay, a strait, an island, a cape, a peninsula.

Some Saturday you might go to the Park, taking pencil and paper with you. Stand where you can get a good view of the entire lake, and then make a map of what you see. One boy who made such a map gave names to the different parts. For example, a tiny bay was called Holiday Bay, an island was named Candy Island, and a peninsula was called Duckshead, because at the moment a duck went sailing past the point of land.

Those of you who have been in Bronx Park may have seen the pretty stream of water that runs through it. This is the Bronx River in its widest part. In what direction does the Bronx flow? How does the land slope? Why is the Bronx widest near its mouth? Does it pass any towns? Name them. Find another stream near the Bronx. What is its name? Compare it with the Bronx. Why is it called a creek? Find another creek on the border of Manhattan and one in the borough of Queens. Which of these is like a strait? What larger streams can you point out?

The Hudson is one of the most beautiful rivers in the world. If you cannot sail upon it, perhaps you can go to the top of a high building in Manhattan and look across the river. For several miles above the Battery the shores are fringed with wharves, and the waters are fairly alive with moving boats. What name is given to this part

Fig. 125.

St. Paul's Church, where Washington worshipped.
(Copyright by G. P. Hall & Son, N.Y., 1900.)

of the Hudson? As you turn your eyes northward, there are fewer boats to be seen and the shores begin to show rocks and trees. Still farther to the north the trees are thicker, the land becomes higher, and on the west bank, just opposite Fort Washington, you see the great, steep, almost vertical cliffs, wooded at the top, known the world over as the Palisades. This is just the beginning of them. They continue many miles to the north.

While you are here, take a look

far over the New Jersey shore. There you can see the only mountains that are very near to our city. What is their name? These we call mountains, though, compared with the great mountains of the world, they are mere hills. Where is the highest land on Manhattan Island?

III. THE HARBOR AND THE WATER FRONT

There is to-day but one city in the world that has a greater commerce than New York. And yet in 1800 there were other cities in the United States which were far more important as business centres. That was before the building of the Erie Canal (1825). Soon after the canal was opened, New York became the greatest seaport of our country. Can you tell the reason? Since that time many railroads have been built and they now bring to New York from the West the greater part of the wheat, corn, and cattle that used to reach here by way of the Great Lakes and the Erie Canal.

Why do most of the great railroads of the East centre in New York? There are other cities along the Atlantic coast to which they might go. It is because New York is the best shipping point in the United States. The products brought here can be met at the very piers by the steamers that bear them away. Again, why do most of the steamship lines have their vessels sail to and from New York? Because the products that they bring from foreign countries can in turn be loaded at the piers on the trains that take them to all parts of our country.

The great vessels that plough the ocean can move only in deep water. In New York harbor the water is deep enough for the largest of them to lie close to the wharves.

All kinds of vessels, large and small, must have protec-

tion from storms when in port. Here they find perfect safety. Why? (See page 57.)

Depth of water and protection from danger, however, are not enough. There must be plenty of room on the wharves. Most cities are content with a single line of wharves. But the island of Manhattan alone has piers on three shores, not to speak of Brooklyn and Richmond. Thus we have depth of water, protection by land, and hundreds of wharves. Still the harbor would be of little use, were there not excellent means of entering it. A glance at the map will show how well provided New York harbor is with entrances and exits. By way of the Hudson River and the Erie Canal, boats may go to Buffalo, from which city ships carry passengers and produce across the Great Lakes to the very heart of the United States. By way of the East River and Long Island Sound, boats may go to ports in nearby states or on to the north. By way of the Narrows, the smallest of the exits, boats may leave the harbor for the great ocean itself, and sail to the warm lands of the South or to the other side of the world.

Before vessels are allowed to enter the harbor they must stop at the Quarantine Station on Staten Island, so that the doctors employed by the government may go aboard and see whether any passengers are suffering from contagious diseases.

In the harbor, one of the most delightful sights that greets the eyes of passengers is the great figure of Liberty, standing where she may best welcome them. Most of the great liners, flying flags of many nations, land on the New Jersey shore or on the west side of Manhattan Island. On the decks of these are American tourists, returning from travels abroad, or strangers visiting our country. But most interesting of all are the great numbers of immigrants, most of whom arrive with but little money. These people are taken afterward to Ellis Island where they are received by the officers of the government. There you may see olive-skinned Italians wearing ear-

rings, and little Russian children with caps of fur even in summer. Fair-haired Norwegians and blue-eyed Germans, their faces glowing with health, likewise are gathered, waiting to be admitted to the United States.

The ocean liners do not carry passengers alone. In their holds are cargoes from almost every country in Europe. After the people have been landed and their baggage examined and removed, the hatches of the vessels are opened and the work of unloading begins. A French liner may contain wine and silks, or she may have gloves, toys, and perfumery. An English steamer will perhaps bring linen made from Irish flax, and cotton goods manufactured from the raw material that we have sent over there from our Southern States. Perhaps she will have a load of steel manufactures — knives, scissors, razors, needles, etc. A German vessel may be laden with woollens, and possibly, like the French liner, she will be carrying many casks of wine.

When sailing day comes again for these vessels, how different the passengers and the cargo each carries! Again among the passengers are some Americans making their trips to European cities, but instead of the foreign immigrants who throng the steerage gangway on the incoming steamers, are groups of prosperous, English-speaking people returning to visit their old homes on the other side of the ocean.

We have seen that the goods received from England, Germany, and France are chiefly manufactured goods. Why should we not return similar goods to them? These countries do not raise enough corn, wheat, and other grain, nor have they enough cattle to feed their people. We have more than enough of these products, so we return them in payment. We also manufacture some articles which they do not make, and these they are glad to receive.

Can you now tell why we send wheat and oil (kerosene) to England and France, but not to Russia?

Great as is the amount of trade carried on by the regular ocean steamships, most of the world's commerce is carried on by means of other vessels, which, though not so fine in appearance, are exceedingly important to merchants of all countries. You can see them constantly coming and going in the harbor of New York. They

FIG. 126.

A scene at the docks near the Brooklyn Bridge on the Manhattan side.

seldom lie on the west side, but as a rule are docked at the East River wharves, or just off Brooklyn. They are called merchant ships or freight steamers, and are known also as "tramp" steamers because they do not always sail between the same ports. From Brazil, China, Canada, Africa, Mexico, India, Central America, — from almost every corner of the globe, they come, bringing valuable

cargoes, and depart with cargoes of American growth and manufacture.

Here are long lines of men, each carrying a great bunch of bananas on his shoulder. Yonder are others throwing cocoanuts from the hold to a neighboring dock. In the air is swinging a huge crate filled with chattering monkeys, while the trunk of an elephant is raised from the deck of the newly arrived steamer as if to ask "What strange place is this?" The cries of a hundred noisy green parrots add to the confusion. On another dock near by lie heavy pieces of dark-looking wood which appear of little value. But if you could follow these rough logs until they reach the sawmill where they are cut into smaller pieces, and then watch them as they pass through the hands of skilled workmen, who fashion them into beautifully shaped chairs, and tables, and cabinets, and finally give them the brilliant polish that shows their rich, red color, you would scarcely wonder that such a cargo is a precious one.

Some of the freight steamers may be seen off Staten Island. They have along their sides great pipes through which is being pumped the oil that is to light the homes of many nations. This oil comes all the way from Pennsylvania without being carried by either boats or cars. Can you tell how it is brought?

Not all the regular ocean steamers, however, go to Europe. On the East River are the piers of many of the lines that sail along our coast to northern and southern ports, — Portland, Boston, Philadelphia, Baltimore, Charleston, Savannah, New Orleans, Galveston, and parts of Cuba and of other West Indian islands.

Among the different kinds of vessels moving rapidly about the harbor are the graceful pleasure yachts of the wealthy, and strong, majestic war-ships that are always to be found near Brooklyn Navy Yard. There are also the ferries that carry thousands of people each morning to Manhattan from Brooklyn, Queens, Richmond, and New Jersey, and back again in the evening.

Along both rivers are flat-looking floats on which are freight-cars loaded with a thousand things produced in the city. They are pushed on to these rafts at the railroad station, ferried across the rivers, and most of them are unloaded at the docks of Manhattan. The floats are carried along by smart little tugboats that tow, as well, many other craft, — the rafts loaded with bricks, or coal, or lumber, and the clumsy canal-boats from Buffalo or other parts of the state. The canal-boats after leaving the canals, have to depend upon these tugs to tow them to the city. The tugs are truly quite as important in their usefulness as the swift ocean greyhounds. Then there are excursion boats, all white, flags flying and busy paddles churning the water. They look quite large until some passing vessel with many covered decks, towers above them like a great white giant — one of the Sound steamers from Fall River or Newport.

Review Questions. — (1) Through what waters would one pass in going from the Bronx River to Coney Island? (2) Give the names of two regular lines of steamships flying the British flag; the German flag; the American flag; of one flying the French flag. (3) How can a ship enter New York from the Atlantic Ocean without sailing through the Narrows?

IV. STREETS AND AVENUES

THE visitor to New York might well be puzzled to find his way among some of the older streets of the city. At the southern end of Manhattan the streets turn and twist in every direction. Old Indian trails, or perhaps paths that led to the barns of early Dutch farmers, fixed the direction of the oldest streets of Manhattan and Brooklyn.

When we hear the names of some of these streets, we are reminded of the days of long ago. Maiden Lane, Stuyvesant Street, Beaver Street, tell something of the former history of Manhattan. Fulton, Washington, Adams, and Jay streets, in Brooklyn, speak of early history there.

In the newer parts of the city the streets are laid out at right angles and for convenience many are numbered, and in arrangement are much like the streets of other modern cities. In the borough of Manhattan there are long streets running north and south, known as avenues. These are crossed by shorter streets which run from river to river.

With the exception of Fifth Avenue, the avenues have lines of cars running along them, most of which are moved by electricity. At some of the cross-town streets these lines are crossed by other lines, the principal ones being those on Canal, Grand, Fourteenth, Twenty-third, Thirty-fourth, Forty-second, Fifty-ninth, and One Hundred and Twenty-fifth streets.

Below Central Park, and especially below Union Square,

lies the great business district of Manhattan. Broadway, perhaps the most important of the avenues, runs through its central part.

Fig. 127.

A scene in Broadway. (Copyrighted by Geo. P. Hall & Son, N.Y., 1900.)

From early in the morning may be heard the rumble of heavy trucks from the wholesale houses, and the rattle of the lighter wagons from the retail shops, all helping to swell the traffic and increase the noise. Electric cars whose tracks occupy the greater part of the street, pass up and down unceasingly. Broadway at its busiest hours is a scene of bewildering confusion. Policemen are stationed at certain crossings to halt the traffic at intervals in order to allow people on foot to cross the streets. Both sides of lower Broadway are lined with handsome office buildings, some of them the highest in the world, while farther up-town are the splendid stores.

Fifth Avenue, almost exactly in the middle of Manhattan Island, has been selected as the dividing line between the east and west sides of Manhattan. Streets from Fifth Avenue to the North River are called west, and those from Fifth Avenue to the East River are called east. Facing Central Park are some of the most magnificent mansions of the world. The lower part of Fifth Avenue has some fine shops, and on both Madison and Fifth avenues are the homes of many wealthy people.

East of Broadway at Twenty-third Street are Madison, Fourth, Lexington, Third, Second, and First avenues, and farther east at the widest part of the island are avenues A, B, C, and D. West of Fifth Avenue, the avenues are numbered to Thirteen.

In Brooklyn the main business district includes the streets about the bridge. Williamsburg and Greenpoint, formerly separate divisions, are now included in this borough, and have their own centres of industry. The streets of Brooklyn are being constantly extended east and west to make room for new homes. Among Brooklyn's boulevards is the Ocean Parkway, along which in the summer thousands of people ride direct to the seashore.

The Bronx was once part of Westchester County. Numerous bridges now connect it with Manhattan, so that many of the streets which begin in Manhattan are continued north through The Bronx. Third Avenue is the main business street.

The names of the old villages, formerly parts of The Bronx, are still kept in the names of the railroad stations. Mott Haven, Melrose, Morrisania, Tremont, Fordham, Williamsbridge, and Spuyten Duyvil are some of these.

TRANSPORTATION

Queens and Richmond boroughs are as yet but partly developed. In going through the farms of these boroughs we could easily forget that we were in the city. Yet there are many business centres. Long Island City, Astoria, Flushing, and Jamaica were formerly towns. Richmond (Staten Island) is most thickly populated on its north shore, and is the centre of a large oil trade, as well as the terminus of a very important railroad.

FIG. 128.
An elevated railway in New York.

In each of the boroughs most of the people are carried on surface cars. In all the boroughs except Manhattan such roads are operated by overhead trolley, that is, the electric current is carried along a wire in the air. In Manhattan the electric cars are operated by underground trolleys. There are besides, elevated

railroads run by electricity or steam, and in Manhattan there are tunnels as well. With all these ways of carrying passengers more means of travel are needed.

In Manhattan there are elevated railroads, popularly known as "L" roads, on both the east and west sides. That on Ninth Avenue is the oldest, but the main west side route is Sixth Avenue. This joins the Ninth Avenue road at Fifty-third Street and continues as far north as One Hundred and Fifty-fifth Street, where it connects with a railroad for stations to the north. The east side lines are on Second and Third avenues. The Third Avenue "L" runs near the water front down town and winds among shipping offices and drug and tobacco houses and factories. Farther north, this line runs along the Bowery, once a pleasant country road bordered by extensive farms, now a collection of lodging-houses and cheap-looking shops. It continues to One Hundred and Twenty-ninth Street, where the cars cross into The Bronx and go as far as Bronx Park. The Second Avenue line runs through one of the most crowded districts in the world and joins the Third Avenue line at the Harlem River.

At Forty-second Street and Madison Avenue is the Grand Central Station. From here run the New York Central railroad lines to the North and West, and the New York, New Haven and Hartford Railroad to the East.

Many who live in Westchester County use these lines daily to go to Manhattan. They live in the suburbs, that is, in the districts near the city, and are therefore called suburban residents.

A branch of the New York, New Haven and Hartford Railroad runs along the Sound from One Hundred and Twenty-ninth Street to New Rochelle. Passengers from Boston for the South cross to Jersey City without changing cars. Large floats carry the cars down the East River around the Battery across to New Jersey.

In Brooklyn there are elevated railroads to every part of the borough, some of which run part of the way on the surface. Brooklyn and Queens, The Bronx and Richmond are covered by a network of trolley lines, which also carry thousands daily to the central borough.

The Long Island Railroad, which runs nearly the whole length of Long Island, has not only a heavy passenger traffic but it brings to the city carloads of farm produce, to help to feed the people.

In Manhattan the tunnel, or subway, starts from the City Hall and runs north, dividing into two tunnels, one going to the extreme north of the island, and one under the Harlem River into the borough of The Bronx.

We have seen that every day many thousands of people go to and depart from Manhattan. How do they cross the waters that surround the island? Ferry-boats, bridges, and even tunnels are necessary for this purpose.

People from Richmond and New Jersey must now cross to Manhattan by boat. A tunnel is being constructed under the Hudson River, however, and plans are being made for another to run to Thirty-fourth street, Manhattan, connecting with the Long Island Railroad. Other tunnels also are being planned to connect Brooklyn and Queens with Manhattan.

Besides the tunnels, there are bridges over the East and Harlem rivers. The Brooklyn Bridge is one of the most wonderful in the world. Every morning between the hours of seven and nine, and every evening from five to seven one may see a sight at the Manhattan end of this bridge that is not soon forgotten. Thou-

FIG. 129.

Brooklyn Bridge, between Brooklyn and Manhattan boroughs. Across the East River are seen the lofty office buildings of lower Manhattan.

sands of people whose daily work takes them to Manhattan arrive on the overcrowded cars that follow one another closely. The station and nearby streets soon become densely packed with people making their way to their various places of business. In the evening the same overcrowded cars carry the thousands back to their homes.

Farther up-town is a second bridge, the East River, or Williamsburg, Bridge, which extends from Broome Street to Brooklyn. A third, the Ravenswood Bridge, is now being constructed; this will extend from Sixtieth Street to Queens, crossing Blackwells Island.

The bridges over the Harlem River are much shorter. Going from east to west are the new First Avenue Bridge, the Railway Bridge at Second Avenue, the Harlem Bridge, the iron drawbridge at Third Avenue for general traffic, and the great drawbridge at Fourth Avenue over which all the railways centring in the Grand Central Station come and go. At Madison Avenue is the Mott Haven Bridge, and just above is the new Central Bridge (McComb's Dam Bridge), a handsome structure. Beyond this are another railroad bridge, and High Bridge which carries water into Manhattan in large cast-iron pipes. Northwest of High Bridge is Washington Bridge, nearly half a mile long. At the end of the Harlem River is Kingsbridge.

Manhattan is connected with Brooklyn and Queens by many lines of ferries. The ferries to Brooklyn are from Wall Street to Montague Street; the Fulton Street Ferry; from Roosevelt Street to Broadway; from Catharine Street to Main Street; from Grand Street to Broadway and Grand Street; from Houston Street to Grand Street; from Tenth

Street and from Twenty-third Street to Greenpoint; and from Twenty-third Street and from Forty-second Street to Broadway. To Queens are the ferries from James Slip and from Thirty-fourth Street to Long Island City; from Ninety-second Street to Astoria; and from Ninety-ninth Street to College Point.

On the Hudson River side are ferries from the Battery and from Liberty Street to the stations of the Central Railroad of New Jersey and of the Baltimore and Ohio Railroad. From Cortlandt Street, Desbrosses Street, and Twenty-third Street, and from Fulton Street in Brooklyn, are ferries to the Pennsylvania Railroad station. From Chambers Street and from Twenty-third Street, boats connect with the station of the Erie Railroad, while from Barclay Street and Christopher Street, boats run to the station of the Delaware, Lackawanna and Western Railroad. The West Shore Railroad connects with ferries to Forty-second Street and Franklin Street. Besides all the ferries of the great railroads, there are four others; one from Fourteenth Street to Hoboken, one from Whitehall Street to Staten Island (Richmond), one to Governors Island and the other to the Statue of Liberty on Bedloes Island.

Although there are many factories and business houses in the various boroughs, the greatest number of people are engaged in business at the southern end of Manhattan. The traffic north and south on Manhattan Island is, therefore, especially great. Why?

V. THE PEOPLE AND HOW THEY LIVE

If we measure the amount of ground it covers, New York is the largest city in the world. If we count the number of people who live here, it is second only to London, England. The smallest borough is Manhattan, yet it contains more than half the people, while the largest of the boroughs, Queens, has, with the exception of Richmond, the smallest population. Queens has about twice as many people as Richmond. The Bronx has almost as many as Queens and Richmond combined, while Brooklyn has nearly three times as many as all three; yet Brooklyn has nearly eight hundred thousand fewer people than Manhattan. All the boroughs combined cover over three hundred square miles and contain about three and a half million people.

How many different occupations there must be to keep so many people busy, how many different materials to keep them all supplied! Not only the wheat to make the bread, but the meat, the vegetables, the cotton, the wool, the silk, must be brought from farms and pastures hundreds and even thousands of miles away.

We have already learned that much of the corn and wheat which comes to New York is sent to other places; but with so large a population a great deal must be used in the city itself. Some of the silk and the wool must be kept to make into clothing, and so of everything that reaches the great city, a portion is retained. What is ready for use is sent at once to the stores to sell. Much material, however, must first pass through the hands of workmen. Thus

leather must be cut and sewed to be made into shoes; cotton must be woven into cloth; lumber must be changed into furniture; and iron must be moulded, and cast into tools.

In sailing along the river front, one sees hundreds of tall chimneys ; most of these belong to the factories where the raw, or "crude," material, as it is called, is changed into useful and beautiful objects.

There are factories in all the boroughs, though most of them are in Manhattan and Brooklyn. In many parts of the city, not only are factories grouped together, but particular trades or occupations are found in the same neighborhood. Thus the financial, or money district, is around Wall and Broad streets. The wholesale jewelry district is on and near Maiden Lane. That for wholesale dry-goods is west of Broadway, from Chambers Street to Canal, while the leather district is near Frankfort, Pearl, and Ferry streets.

Many of the factories are large, and hundreds of people are employed in them; others occupy but two or three rooms, and need only a few workmen. Some factories make large objects, such as boilers or printing-presses, and there are yards where ships are built: others manufacture small articles, such as finger rings and penknives.

Factories do not often sell many of their goods where they make them. Sometimes, if factories are very large, they have shops where people may buy small quantities. Generally, however, factories send their goods in large quantities to men called "wholesalers." These in turn sell to those who keep retail stores where we do most of our shopping.

The wholesale establishments of New York are among the greatest in the world. The owners of retail shops in many other cities come here to buy their stocks. At certain seasons of the year the hotels are filled with people from all over the country and even from Canada,

Mexico, and the West Indies, who come here for such purchases.

Many of the retail shops are very beautiful. The largest of these, where one can buy almost anything he wants, are known as Department Stores. They are found chiefly on Broadway, Fourteenth and Twenty-third streets, and on Sixth Avenue in Manhattan, and in Brooklyn, on or near Fulton Street. In one of the largest of the department stores thirty-five hundred people are employed.

In some of the smaller stores, but one line of goods is sold. Such are the places where we go to buy our meat, our groceries, or our bread. How many of us when going to buy a pound of tea, think of the labor needed to bring it here ready for the table? The tea leaves were growing on a plant not very long ago. Chinamen gathered the tea and then sent it in chests down some river filled with countless boats. It may have come by sailing-vessel or by steamer, and perhaps reached San Francisco a month ago. Then the chest, with hundreds of others, was carried in a wagon to the train. When it reached New York it was first stored in a great warehouse. Then it was bought by wholesale tea merchants. They sold it to other dealers; and before it reached the shop where you bought it, it passed through the hands of perhaps a dozen people.

Can you tell the history of the sugar the grocer sells? Learn all you can about the way in which it was prepared, and how it came here.

So we might go to a great store and learn the story of the silk, or of the diamond that shines in its gold setting. Every one who has a share in making, selling, or delivering any of the thousands of things received here is paid for his work, and with the money so earned he buys things which he needs. Thus the people of the world are constantly engaged in making and exchanging goods of various kinds.

Not everybody has goods to buy or sell. Some own land and houses which they allow people to occupy for a time by paying rent. Many men make their living by selling things for other people; a man who cannot himself rent or sell his house, often pays some one for finding him a tenant. Then there is the man called a contractor who agrees to

do all of a piece of work for a certain sum. The contractor divides the work among the different kinds of laborers needed, paying each his share, and keeping the rest for himself. Other men unite in forming companies and corporations, of which there are many kinds. Some, called banks, take care of people's money and lend money to people who pay for the use of it. Then there are insurance companies which agree to pay back the cost of houses that burn down, provided the owners pay the companies certain amounts for each year that their houses stand.

Very often no one man has money enough to build large steamers or railroads or to start other great business undertakings; then many men band together to bear the cost and share the profits.

Most people have neither goods to sell nor money to invest. They are the class who sell their *work*. When the work is done by the hands only and does not require much thought or skill, the pay is usually small; such is the case of the laborers who do the simpler work in building our cities. Those who have had training in various trades get better wages. Such workmen are necessary in every factory and workshop. The mason, the carpenter, the mechanic, the printer, represent but a very few of the many trades or occupations. Honesty and often courage, rather than special training, are the important requirements in many occupations, as for example those of the conductor, the motorman, the clerk, the policeman, and the fireman. In great business centres there is employment for both men and women that requires much intelligence and ability. The stenographer and the bookkeeper are of this class. But the work for which people are usually paid best is that which has required a great amount of special study and preparation. In this connection we may name the teacher, the architect, the lawyer, and the physician.

The men who work to earn money are the same men who pay some of that money to have other work done. No one is so skillful that he can do everything himself. We all work for others, and, in turn, others work for us.

Even the man whose daily labor is breaking stones, and who never actually pays out money for any one to work for him, has, in reality, certain servants whose wages he must help to pay. The servants whom nobody pays and yet whom everybody pays are people employed and paid by the city.

REVIEW QUESTIONS. — (1) Name some of the principal things you eat, and tell where they come from, and how they are brought here. (2) Name some articles in your grocer's store that are made in New York. Some made outside of our country. (3) Can you tell how a ton of coal is brought from Pennsylvania to your home? (4) How many factories do you know about? (5) Mention some of the raw materials used in them. (6) What trades were represented in building your school?

At the head of the city government is the mayor, who appoints the heads of the different departments, such as public parks, ferries, and docks, and a number of others. The people elect also a comptroller for the whole city. It is his duty to see that the city's money is paid out only for lawful purposes. There is also a board of aldermen elected by the people. Besides these officials, each borough has a president who appoints the heads of the departments in his borough. These men, however, do not interfere in any way with the heads of the departments appointed by the mayor of the whole city.

The presidents of the boroughs together with the mayor, the comptroller, and one other officer, compose a Board of Public Works, and decide all questions of public improvements, such as the paving of the streets and the making of public parks. There is another body, called the Board of Estimate and Apportionment, composed of the mayor, the comptroller, and some other officers. This board decides how much money shall be spent each year by the city and how this money is to be divided among the different departments.

You all know what kind of work is done by the firemen and the policemen. The firemen, while on duty, stay at the various fire stations and engine-houses, where they may hear any alarms sent in and instantly answer the calls for help. Some policemen patrol the

streets to see that the laws of the city are enforced and to arrest any who break those laws. Others remain in the station-houses, so as to be ready to act at once in cases of riots or accidents.

The work of the health inspectors and the street cleaners is as important as that of the firemen and the policemen. New York has a large number of men whose duty it is to remove the dirt from the streets with broom and shovel, and occasionally to wash the streets by letting water rush over them from the hydrants.

Health inspectors are sent out by a body of men called the Board of Health, to visit houses in all parts of the city in order to see that everything is in a healthful condition. There are certain simple laws about drainage, and the removal of garbage, ashes, and like things, that every one should know and keep.

In houses where sickness has occurred, the health inspector has the right to order that the place be disinfected, and in cases of some contagious diseases he must see that the sufferers are removed from among the well people.

The homes of Manhattan are not for the wealthy or well-to-do alone. There are districts where the houses are so crowded with people that there are as many in a single block as in some towns. The rooms are small and often poorly lighted. These people usually work very hard, and do much for the prosperity of the city.

Many of these have come from Europe. Of the thousands who arrive every week from abroad, many remain in New York because they have friends here.

When an immigrant lands, he naturally wishes to go where the people understand his language and his way of living. But those who come from the British Isles can get along anywhere in this country. Why?

Many people have come from the southern countries of Europe, and they have often made little cities of their own in the midst of this great city. If you walk through the streets of these neighborhoods, you will hear the older men and women speaking strange

words. Their clothing is different from yours and their little shops seem very odd to you.

Most of the Norwegians and Swedes who come to this country go to the West. The foreign parts of New York City are now made up of people mostly from southern and southeastern Europe. Manhattan contains many such localities. In the district east of the Bowery, from Catharine Street to Houston Street, is a population greater than that of most American cities, composed almost entirely of Russian and Roumanian Jews. From Mulberry Park to Bleecker Street is a large Italian population. There is another large Italian colony south of Washington Square, one on the east side of Harlem, and one in the western part of The Bronx.

There is a German and Hungarian district on the east side from Houston to Fourteenth streets. Even China is represented around the lower end of Mott Street. Brooklyn, too, has its foreign districts, the best known of which is "Brownsville."

By what magic are all the children who come here, knowing nothing of our laws, customs, or language transformed into Americans? Every few blocks you will see a handsome building with the flag of our country floating above the roof. It is a public school. Here it is that the wonderful change is largely accomplished. From the schools the children take home to their parents the lessons that give them hope for their own future and a love for their new country.

If the boys and girls of the city would visit on Saturdays and holidays the parks, the museums, and the great avenues, they would learn more of the beautiful city of which they see but a small part every day, and they would feel proud to be numbered among its citizens.

VI. PLACES OF INTEREST

ALTHOUGH land in the crowded portions of New York is very expensive, ground for parks has been bought by the city and the parks will be laid out from time to time as needed. Central Park, in Manhattan, is the principal public park in the city. It extends from Fifty-ninth Street to One Hundred and Tenth Street, and from Fifth Avenue to Eighth Avenue. It is noted for the beauty of its drives and walks, its lawns and gardens.

Central Park has, too, tennis, baseball, and croquet grounds. On the east side is a fine menagerie. Farther north there is the Metropolitan Museum of Art which contains a large collection of fine paintings and statuary. Near by is the Obelisk, thousands of years old, which was brought all the way from Egypt. West of the Park, in Manhattan Square, is the Museum of Natural History. Here we may see articles belonging to people of every age and country, by which we can tell a great deal of their customs and habits. Here, too, are model specimens of birds and other animals.

Prospect Park, in the borough of Brooklyn, is very beautiful. There is a fine arch at the entrance, built in memory of those who died in the Civil War. Near by is the Brooklyn Institute where there is a good collection of birds and other specimens belonging to the animal world.

Van Cortlandt, Bronx, and Pelham Bay parks, in the borough of The Bronx, are connected by a fine boulevard. Van Cortlandt and Pelham Bay parks on the northern boundary of the borough are in their wild state with the

exceptions of grounds which have been laid out for public games.

Bronx Park is at the end of the Third Avenue Elevated railroad. Through it flows the Bronx River.

Near the railroad station are the Botanical Gardens in which are many rare shrubs and flowers. There are two houses made of glass which are so high that tall trees can grow in them. Here we may see bananas and pineapples growing as they do in tropical countries. The Zoölogical Gardens are to the south of the Botanical Gardens. The cages cover so much space that the animals can move about freely. This adds greatly to their comfort, and allows visitors to see them easily, and to form correct ideas about their habits.

Near the Cathedral plateau, at One Hundred and Tenth Street, is Morningside Park. Above it are the new Cathedral, St. Luke's Hospital, and Columbia University.

Riverside Park, which begins at Seventy-second Street, is a high terrace on the Hudson surmounted by a drive at the end of which is the tomb in which lie the remains of General Grant. On the drive is the new monument in memory of the soldiers and sailors who died for our country.

Union Square, at Broadway and Fourteenth streets, and Madison Square at Broadway and Twenty-third streets, Washington Square, at the foot of Fifth Avenue, with its beautiful arch, and Bryant Park, on Forty-second Street, in which the new library is being built, are all on busy thoroughfares and offer convenient resting places for grown-up people and pleasant playgrounds for children.

City Hall Park, near the lower end of Broadway, contains the City Hall, a simple but beautiful building, and the County Court House. Just below the Park is the Post Office.

There are many smaller parks in the city, most of them in Manhattan. Battery Park, at the southern end of the island, affords a splendid view of incoming ocean vessels; in it is the Aquarium, which contains salt-water and fresh-water fishes from all parts of the world.

In the very crowded parts of the city are the small parks which have done so much to improve the condition of the people in their neighborhoods. Such are Mulberry Bend Park, Tompkins Square, Seward Park, Stuyvesant Square, and East River Park. In common with the recreation piers on the riverside, they give much relief to the people during the hot weather.

Every one should visit Cooper Union, established by Peter Cooper, at the northern end of the Bowery. In this building free evening classes in every variety of subject are open to both men and women. The College of the City of New York, which will soon be removed to St. Nicholas Heights, and Columbia University, both for the instruction of young men, are in the northern part of Manhattan. The Normal College for young women is at Sixty-eighth Street and Park Avenue. New York University is on University Heights on the Bronx side of the Harlem.

Besides the public buildings on the islands of the East River, there are in all the boroughs many fine hospitals as well as institutions for the shelter and care of those who have lost their relatives and friends.

In Brooklyn is the Navy Yard. After passing the sentry at the gate, one is no longer in New York City but on land belonging to the United States Government. Here one can generally see a ship being built or being made ready for a long cruise, while, opposite the Navy Yard, vessels of our Navy lying at anchor afford an interesting and attractive sight.

In the borough of Richmond there is a pleasant home for old seamen known as "Sailors' Snug Harbor."

At Fifty-first Street and Fifth Avenue is the Catholic Cathedral. On Broadway opposite Wall Street is old Trinity Church and at the corner of Fulton Street is St. Paul's. Both are surrounded by churchyards in which people have been buried for two centuries. There are many other fine churches in all the boroughs, especially in Manhattan and Brooklyn.

To tell of all the monuments, the public buildings, and the magnificent residences of New York, would require a great deal of space. People who live in New York should know its attractions and visit them often. In this way we learn to become more and more proud of our city, not merely because of its wealth, its size, its population, but also because of its beauty, and its value to the nation as a centre of art and learning.

Review Questions. — (1) What is the quickest route to Van Cortlandt Park from Twenty-third Street and Broadway? To Prospect Park from the Battery? (2) In a bicycle ride from the Brooklyn Bridge to Coney Island, through what principal streets would you pass? (3) In sailing from Blackwells Island to the North River through what bodies of water would a vessel pass? (4) A passenger arriving at the Forty-second Street Station, from New England, desires to go South by the Pennsylvania Railroad. What car-line should he use to make connections? What is the quickest route from your school to the Battery? To Eighteenth Street and Sixth Avenue? To Pelham Bay Park? To City Hall, Brooklyn? To Staten Island?

VII. THE HISTORY OF OUR CITY

We have learned that New York, like the rest of our country, was once the home of wild Indians. One day, nearly three hundred years ago, as some of them were standing on the shores of Manhattan Island, a little vessel came sailing into the bay. It was not very long before the white men and the red men came to an understanding. When the captain of the ship, Henry Hudson, returned to the home of his employers in far-away Holland, he told them of the beautiful bay and of the furs which the Indians had to sell.

Within a few years many Dutchmen came to the new country, and the Indians willingly exchanged valuable furs for the pretty, but cheap little gifts of the white men. Settlements were soon made in Brooklyn and Manhattan, and then fair Dutch women and little Dutch boys and girls began to appear on the streets of the new town.

The first governors whom the Dutch sent were not wise, and sometimes they made the Indians angry. Once there was a fierce war in which some of the whites were killed. To protect themselves, the people built a high wall across the northern end of the city, as the city then was, and though it was torn down some time afterward, the place has ever since been known as Wall Street.

The people were not happy and often grumbled because the governor obliged them to pay taxes without giving them a chance to make any laws. They wanted to govern themselves. At last they were allowed to have a small share in their own government. Peter Stuyvesant, the old

governor, permitted some of their number to become officers of the city. As time went on, the little town, which was called New Amsterdam in honor of a city in Holland, grew larger and richer. Slaves were brought in, fine houses were built, and villages were started beyond the wall.

A little more than fifty years after Henry Hudson sailed into New York Bay, the English captured the city from the Dutch. Of course there were many changes. The city received a new name — New York — in honor of the English Duke of York, to whom his brother, King Charles, had given the land.

New streets received English names. Greenwich, Chelsea, and Harlem are names that tell of the little villages that once flourished on Manhattan, just as do names that still cling to various parts of the other boroughs. Even to-day we find the American descendants of the old families, some of them bearing English names and some Dutch names. Many names that were originally Dutch have been changed to sound like English ones.

The English held New York almost continually for one hundred and twenty years. By the end of that time the population was more English than Dutch.

After its capture by the English, the growth of the city continued but slowly. As before, some of the people were constantly quarrelling among themselves and with the government.

The English had had New York only twenty-five years when there was a great revolution in England which placed a new king on the throne. In New York the English governor was sent home and the government was taken by one of the merchants of the city. The feeling between the English and the Dutch was very bitter. Later, a new governor came over from England.

Every American boy and girl has heard of the Battle of Lexington — of the struggle against England made by the colonists when the government tried to tax them unjustly. Like the old Dutch citizens of Stuyvesant's time, the people again cried out for a share in the management of their own affairs. By this time the old feeling between the Dutch and the English had partly died out. There was instead a division throughout the colonies between those who supported the English at home, called Tories, and those who believed that everybody should strongly resist the injustice of the new laws. The latter were called Whigs. Fights between the soldiers and the Whigs were frequent. When the tax was laid on tea, the Whigs in New York followed the example of their party in Boston, and on its arrival here the tea was thrown into the water so as to make it impossible for people to buy any of it.

The Whigs in New York did much to join the people together against the King who sent over ships loaded with soldiers. The people of the city now became more determined than ever.

Under the leadership of the most active of their party — men who called themselves the Sons of Liberty — the Whigs took possession of the city. When Washington, who had been asked to take command of the American forces in Boston, passed through the city, great crowds gathered and wildly cheered him.

In August of the year 1776 occurred the battle of Long Island. The famous Declaration of Independence, which had been made at Philadelphia, July Fourth, had filled the people of the colonies with strong determination.

As the British fleet began to assemble in the Lower Bay, the American army prepared to meet them. Washington with the main part of his forces remained on Manhattan Island, but Brooklyn, where he expected the fight would occur, was fortified as strongly as possible. Nine thousand American soldiers occupied Brooklyn Heights. The entire American army consisted of nineteen thousand men, gathered from every part of the colonies, while the British under General Howe numbered thirty-one thousand, most of whom were soldiers of long experience.

The British landed at Fort Hamilton, so the two armies faced each other. A fierce battle took place in which many Americans were killed, and a large number taken prisoners. What remained of their forces was pressed slowly back to the edge of the river. This battle discouraged the Americans greatly. At any moment the British might sail up the East River and completely surround them. Washington at this time performed one of those wonderful movements which have made him so famous as a general. He directed that at night the camp-fires should be left burning. Then, while the British were waiting for the next sunrise to capture what was left of the army, he collected a fleet of boats of every kind, and the Americans safely crossed over to Manhattan Island. Next morning when the British awoke, they had the entire place to themselves,

On the 15th of August the British entered the city which then extended as far up-town as Chambers Street. Washington now had a position extending from One Hundred and Forty-seventh Street to the Harlem River. As the British pressed on, the Americans retired to the high land in the northwestern part of the island, Washington's headquarters being the Morris House (now the Jumel Mansion), near the present High Bridge.

On the 16th a battle took place and though the British General Howe still remained in New York, the success of the Americans filled them with new hope and confidence.

While Washington retired to the North, he still held Fort Washington. On November 16th the British in a

fierce attack captured it, together with some of the best men of our army and many guns and stores. This was one of the most serious losses of the whole war.

From this time until November 25, 1783, the city was in the hands of the British. It was a time of great distress among the people. Two fires destroyed a large portion of the city. In the horrible prison-ships to which prisoners of war were taken, it is said that over ten thousand died during these years.

In City Hall Park you may see the excellent statue of Nathan Hale,—a young American officer who was executed as a spy when found within the British lines. His last words should be remembered by every American. "I only regret," said he, "that I have but one life to lose for my country."

With the close of the American struggle for liberty begins the story of our nation. A new government was formed, and with one voice George Washington was chosen as its head.

The honor of being the first capital of the new country belongs to New York City. In front of the Subtreasury, on the corner of Broad and Wall streets, is a splendid statue of Washington. On this spot, in 1789, before the citizens of New York, he took the oath of office as the first President of the United States.

From this time the story of New York is one of prosperity and success. In 1783 there were in the city twenty-three thousand people, and in 1810 that number had increased to ninety-five thousand. In 1807 the first successful steamboat, the Clermont, sailed up the Hudson River. Robert Fulton was its inventor, and his work did a great deal toward bringing about New York's wonderful prosperity.

We have already learned how great an influence the opening of the Erie Canal had in making New York the first city of the country. We should ever hold in honor the name of De Witt Clinton, first mayor of New York City, and afterward governor of New York State, for it was through his efforts, more than those of any other man, that the canal was opened.

The railroads completed the work of the steamboat and the canal. The chances which they opened to the people were not neglected. The business men of New York have ever been noted for their share in building up the fame of their city and its people have ever been ready to contribute time, thought, and money to its welfare.

The old city was confined to the island of Manhattan. In 1873 a portion of the present borough of The Bronx was added, and in 1895 The Bronx was extended northward to Mount Vernon. In 1896 the legislature made the boundaries of the present city with its division into five boroughs.

The first mayor of Greater New York was Robert Van Wyck, who took office on January 1, 1898. The second was Seth Low, who began his term January 1, 1902.